THE

SOUTHERN AGRICULTURIST.

JUNE, 1830.

PART I.

ORIGINAL CORRESPONDENCE.

ART. I.—*On the General Management on a Plantation in the Middle Country: by* A PLANTER.

Dear Sir,—IF the following, on the General Management on a Plantation in the Middle Country, is thought worthy of a place in your columns, it is at your service. I have delayed sending it before, from the doubt, whether its details were not too much an every day's business, and too trite to be interesting, and somewhat by the appearance of presumption, in undertaking to give directions where there are so many more competent to instruct. It must be obvious to the least reflecting mind, that the same course of treatment would not be proper for all soils, nor for the same soil in a very wet or a very dry season; indeed, so variant are the soils, and the seasons acting on them, that it is scarcely possible to give directions, however general, that will apply to them: and none are here given, but such as should be moulded in the application by a sound judgment, and in such way I desire to be understood. I would set a crop for provisions and four bags of cotton to each full labourer, by planting seven or eight acres of cotton, and from three to six of corn, besides small grain, and would put ploughs into the hands of one-third of the workers, of whom one-half should be skilful, as I would

provide mould-board ploughs, (the best of which that I am acquainted with, are those set on shovel stocks) large shovels from 9 to 12 inches, colts-foot and straight-tooth harrows, skims, &c. The cotton to be hoed over once in twelve or fourteen days, the corn twice in the season, and both cotton and corn to be ploughed over in twelve or fourteen days. The ploughs to go twice or three times in the rows, and do from three to six acres per day, the hoes an acre each, as is usual. The number of ploughs on a well-stocked plantation, where you design to cultivate corn for sale, should be enough to attend all the corn crop without the occasional assistance of those which precede the hoes in the cotton. I would commence the winter preparation for this crop on the first of January, or earlier, if the cotton is all gathered in, by putting cotton in all the corn and small grain lands of the preceding year, and corn into the cotton lands, as they both benefit by the exchange. I would pull up and lay the corn-stalks uncut into the alleys where they grew, and with the hoes list or draw all the grass, grass-seeds, weeds and surface soil from the beds on them, a mould-board plough follow- and covering with two cuts close to them, so as to cover better, and to raise the earth high as it is to be the top of the future bed; the same is to be done with all the other grassy lands intended for cotton. On clean lands I would lay the cotton-stalks in the centre of the alleys, and not use the hoe, but cover with two cuts of the plough; there is not much advantage gained by listing with the hoe on clean ground; far otherwise: where there is much growth in the ground, and if you do not use the hoe, you double the task: the stalks are better laid with the roots in the same direction, for the greater convenience of ploughing, but it is not very material. I prefer not to run a furrow to list in, because as the grass and other growth cannot so easily be got to the bottom of the furrow, it becomes mixed with the ploughed up earth, and part is on top, and as the same earth cannot be returned from whence it came, the list is made too large, and is not effectually covered by the plough. Where you design to run your rows in a contrary direction to those of the previous year, or you change their distance apart, it is neater to have lists, and you must, of course, run a furrow, and deep enough to go to the bottom of the old bed, where you cross it. The foregoing is the usual winter preparation; but where you wish to save time for any other purpose in

the winter, you may, on your light and dry lands, pull and lay the cotton-stalks in the alleys, and not hoe-list, if not grassy, and so leave it till planting; then two cuts of the mould-board plough thrown on it, makes a bed, which the hoes following immediately chop, and the planters following them, drop the seed and cover with the foot. I think there is more moisture and more certainty of a good rise of cotton in this way. The first working of this cotton is done by splitting up the ridge or old bed at one cut of the broad shovel, the hoes earthing it as is usual. About the beginning of March, other furrows are to be added, so as fully to plough out all the alleys or baulks, and the hoes make the beds: where cloddy, as is generally the case in our swamps, they are to be reduced by the straight-toothed harrow. It is, perhaps, best to make them up with the hoe, as they can better regulate the height and width according to the land. You may make them up with two cuts of the triangular harrow, or by one cut of the rounding harrow, on good ground well thrown up with the plough, or after the plough alone. The rounding harrow you will have an idea of, by supposing two rows of teeth shewing on the under side of the felloe of a wheel. I believe there is a description of this implement in General Williams' very excellent practical letter in your second volume. Your lands for corn are prepared by threshing the cotton-stalks, and by cutting up your corn-stalks into three or four pieces, and by throwing into the alleys two cuts of the mould-board plough; you plant on these two furrows or the old bed, as you see best, after a single cut of a broad shovel across them. I prefer the old bed.

All your lands intended for cotton, should be listed either by hoe and plough, or hand and plough; of which, the latter is by one-half the most expeditious, and it should be done as early in the winter as the necessary provision for your stock will permit; it would be much better if you could keep them out of your fields altogether; they do more injury by their hoofs, than they ever compensate by all other means; every mouthful they take from the field, is so much manure, already placed there for you, and stiff soils they poach in wet weather. The cattle-pen is the proper place for them; the stock should be small where the resource is the fields.

I have thus tried, Mr. Editor, to give you what I consider the usual preparation for a crop of cotton, and corn on stiff and light lands. The making and the application of manures ought to be the subject of another communication. My next, must plant, and try and make the crop, in the actual performance of which I am now closely engaged.

A PLANTER.

April 17, 1830.

ART. II.—*On the Culture and Preservation of the Sweet Potatoe: by* L.

"Robertsville, 25th March, 1830.

Dear Sir,—I have taken the Agriculturist from its commencement, and it has never failed to arrive at its proper time, and in good order, and in return I always give it a perusal, and from each number, I have been more or less edified, but more particularly the number containing Gen. William's communication; and that part of it on making *manure*, I have not only been a reader of that, but a doer; as soon as an opportunity offered, I turned all my forces at it, and this spring I have carried out a great quantity of very fine rich manure, which will this fall more than repay me for the trouble which I was at in making and hauling it out, should the season be favourable.

You requested information relative to the Sweet Potatoe, and my mode of preserving them during the winter; I could have wished that you had asked of an older and more experienced planter than myself, as I consider it of great importance to this section of country, and generally speaking, we know but little as regards the real value of the potatoe. Out of the many planters that surround me, I know but few who enjoy the real benefit of that valuable crop; many think they do well if they can make their crop last to the first of January, only to feed their negroes, when I think they have just done nothing; I say nothing, when some are making them to last for six months in the year, and that to feed every thing that would consume corn in that time. It is my humble opinion, that if each planter in the potatoe

growing country, would curtail his corn-field one-half, and enlarge his potatoe-field in proportion, that soon we would stand along with any country in making provisions, say, let each planter only plant corn enough to last him six months in the year, our lands and climate do not grow the *corn* crop, (or at least our lands do not) for there are but few planters who exceed 12 bushels of corn per acre, when it is quite easy to make from 2 to 300 bushels of potatoes per acre;—this amount may appear large, but I was informed a few days ago, by one of our most respectable planters, that he raised 323 bushels per acre. One would say it was a small piece of ground prepared for that use alone, I can say, (by information,) it was one out of a field of ten acres, no selection being made—what a production! I then asked him if he thought the land would have produced twenty-five bushels corn per acre, he said, it would not have made as much—what a difference! I have been myself quite a successful potatoe planter, though I have never been particular enough to measure; and have made them to last abundantly for six or seven months. Any dry pine-land that originally would bring 400 pounds seed cotton, or 10 bushels of corn per acre, will grow the potatoe, if it is manured, so as to make it produce from 6 to 700 pounds of seed cotton, or 15 to 18 bushels of corn, it matters not whether it is a stiff or a sandy soil; I have tried and proved both, observing to follow this direction particularly. Lay your rows off four feet apart, list up all the vegetable stuff nicely, run a yankee plough on each side of the list, split the middle with a shovel plough, haul up all the loose dirt with a hoe, chop holes with the corner of the hoe at 18 inches apart on the bed, and drop one cut slip in each chop and cover with dirt from the alley; observing to plant about the first of March: all this done, never let any *grass* grow among your potatoes, which is the greatest enemy to that crop of any that I know, it is as well to give them up at once, if they get overrun with grass as to clear them out, for they never will do half as well afterwards. I find no difficulty in preserving my potatoes during winter; the great secret is to dig them early, say, before the vines are killed by the frost, or immediately after the first frost. It comes on in a busy time, and I have seen some planters lose nearly all of their potatoes by digging them late. Have a large quantity of dry pine straw and corn stocks, put the straw first and

then the stocks, and then bank them well, leave a hole on the top of the bank, covered with a piece of pine bark, and after the first rain add more dirt, and pat it well with the hoe. I can only say in conclusion, that every thing that eats corn will eat the potatoe, and will do equally well on them, and they are much better than corn in one point of view, they are not so easily transported by negroes. Hopeing that your subscription list may increase, and wishing those subscribers you now have, may be punctual, that your work may prosper.

I remain, dear Sir, yours, &c.

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ART. III.—*On "the best method of Preparing and Applying Manures:" by* Col. JOS. E. JENKINS.

"Edisto Island, April 6th, 1830.

Mr. Editor,—It is usual in the Agricultural Society of St. John's, Colleton, to discuss practical questions, which have been offered for consideration at the meeting previous. In doing this, the members generally throw out their views, as they happen to suggest themselves at the moment: but it sometimes occurs, that some member, using more care in giving his opinions, will reduce them to writing and read them to the Society. I need scarcely inform you, that by this practice, extremely valuable information is communicated by the older and experienced planters, not only to the junior members of the profession, but often to each other: and I think, it is much to be regretted that the rich fruits of their ripe experience, can so seldom be obtained, except in the evanescent form of colloquial address. The accompanying paper contains the views of one of our members, on one of these questions; and was read before the Society, at their late meeting in March. The author, is a gentleman, and distinguished for manly intelligence; and a planter, of much practical skill and close observation. It was requested, by the Society, for publication in your useful journal; and is now offered to you by order of the Society, with that intention. This is a destination which I believe, the author did not originally contemplate for it; but as the So-

ciety made the request, he thought it right to comply; although his opinions are evidently thrown together with much haste.

In relation to the accompanying communication, (and others exhibiting similar features) it is proper that I should suggest one reflection:—"*In detailing the transactions of his plantation*, the planter can scarcely avoid the appearance of egotism." This, however, practical planters know well how to appreciate; and candid men will readily excuse, should there be any one so inconsiderate as to censure. The planter seldom concerns himself in writing for the press on Agricultural subjects; and when induced to do so, it is generally with the hope of *benefiting others.* In giving to the public, his own individual practice, and the results of that practice, it is obvious to every one who thinks rightly on the subject, that he adopts the surest and safest means of conferring this benefit; inasmuch as, he furnishes information which is *certain;* and therefore, free from all cavil or objection.

I am, respectfully, your obedient servant,

JOHN TOWNSEND,

Corresponding Secretary of the Agricultural Society of St. John's Colleton,

"What is the best method of Preparing and Applying Manures?"

The above question being under discussion in the Agricultural Society of St. John's, Colleton, Col. Joseph E. Jenkins presented the following views on the subject:—

Mr. President,—In the few observations which I shall hazard upon this question, it is my intention, in as brief a manner as possible, to detail my practice; giving, in connexion, a few reasons therefor. I vouch but for the *facts*, stated as such: the *reasoning*, I submit to the consideration of members.

"My present method of manuring is this: as soon as I quit the cotton-house for spring work, (if I have not in the summer previously thrown up my *mud*) I commence with all hands taking it up and depositing it where it can be conveniently taken to the field in carts. I have for these few years back turned into the mud, either in the month of January or February; they depending principally upon

the weight of the crop to be got out. The last year, I was in the mud on the first of December. I find it a healthful occupation for my people even in pretty cold weather; they never enjoying better health than when so employed. Each *couple*, with a *hand-barrow*, deposits per diem, on the margin of the creek, about enough for one "task" and a half; at the rate of a cart-load to the bed. The mud is taken directly from the heap and placed for distribution in the alleys of the old beds; where, after being scattered, it is listed over. My usual practice, is to keep three or four old hands scattering after the carts and before the "listers;" I find *half an acre* a piece to each of these, a good day's work. I do not altogether approve of listing over *mud*. My practice assures me of the fact, that in that position, it gives a decided check to cotton in the spring of the year, and there is some loss of bottom pods evidently attributable to its influence. It would do better on the sides of the listing. It is, however, the most handy way of depositing it, and, perhaps, (where a *top-dressing* is intended to be given with some more *stimulating* manure)—is not to be dispensed with. There still exists in the minds of some, a question, as to the efficacy of this substance as a *manure:* some allowing it merely the negative praise of not being injurious; others, denying its fertilizing qualities altogether. With me there is no question as to its beneficially nutritive powers, provided, it is not too lavishly used. But as it is heavy and inconvenient for carriage, perhaps, there is not much danger to be apprehended on that score. The mud used by myself, from a rough analysis, I find to consist of—first, silex; second, vegetable deposit—say marsh roots, marsh decomposed, and the alluvion of higher land; third, salt, in proportion as we have mentioned. With regard to the first of these components, I apprehend it to be nugatory, unless on *clayey soils*, where it may, probably, act as an apperient, or an absorbent; the second, gently stimulative; the third, questionable. *Salt* is supposed by some writers to act as a *septic*, stimulating the healthful fibres of growing vegetables, by exciting them to feed upon other manures, but not entering itself into the composition of vegetable life. This is probable—I would add my crude notion, that it is most efficacious as a *solvent*. The moisture, which is ever apparent upon the examination of mud which has been covered

from the sun, (and which moisture, we cannot doubt, is attracted by the salt) holds the decomposed and decomposing vegetable manures around it, in that state in which alone the feeding fibres of living vegetables can take them up. Hence is it that marsh-mud becomes so valuable a manure in *dry* seasons; not being, as most other manures are, *so dependent* upon humidity or drought in the external atmosphere—hence, is it, likewise, that marsh-mud disappoints the planter in rainy seasons; or at least gives not that growth and promise in such seasons as cow-pen or stable manure does. It being always a gentle stimulant, from being held in constant solution, additional moisture adds not to its *digestive* faculties. Salt, by other writers upon it, has been condemned as a *manure* entirely; and from several experiments detailed at length in the "American Farmer," it would appear, that the position is held and maintained by every plausible argument. Upon the whole, reviewing both sides with a mind unbiased by prejudice, I think we may safely come to this conclusion, that salt is to be used sparingly: as it is, indeed, used but sparingly in mudding. Having deposited my mud, and listed over it, I proceed to my compost, and here I would remark in passing, that I never have, what is technically called, a "running pen." The whole of my manure for cotton, being made in a stationary pen; which is generally placed as near the centre of the field, intended to be manured from it, as possible: the loss of a few head of cattle (for the guard will sometimes be negligent) is more than compensated, by the subtraction of the difference, in toil and labour which would be requisite (on a plantation located as mine is) in getting it out from a pen, situated near the buildings. My compost this year and generally is made by alternate layers of *marsh* and *pine-trash*, put in successively, and trampled, and dunged by the cattle. Gradually commencing in July, we are carrying in until December or January—this year until January. Over this vegetable compost, I this year made a covering of clay, dug up at the side of the pen from a space twelve feet in diameter, and about six feet deep. It being a very dry fall and winter, this covering was intended in aid of rotting the compost. It, however, became a valuable addition; the cattle having considerably trampled it in, and after the wet weather set in, I had it turned

under and mixed up with the whole mass. With respect to *manuring* with compost, I am decidedly in favour of placing it at the *sides* of the listing. I consider the *tap-root* as promotive of the growth of the *woody* substance or *stalk* of the cotton plant. Is it an improbable hypothesis? To the *lateral* or *side* roots, I attribute the production of the *fruit arms*. To their support, therefore, as materially important functionaries, I would contribute the most; and that I endeavour to do, by giving them the exclusive possession of my manure. At what exact distance from the upper surface manures should be placed, is still an undecided question among agriculturists. I cannot pretend to determine it: but from a few experiments, made as a test for some years back in my cotton-field, I am sufficiently convinced for the determination of my future practice, that the nearer the *upper* surface (provided it is protected from the direct action of the sun) the better: say at the distance of three or four inches. Here it is liable to be moistened nightly by penetrative dews; here it is likewise forced to evolve its nutritious gasses, by the action of heat in the day, whereby the whole mass of superincumbent earth is fertilized.

That manures may become inert by being buried too deep, can scarcely admit of a question, but that the bottom of a commonly made cotton bed is too deep, I will not pretend to assert. Let *that* be as it may, however, there is an objection, to the placing of manure there, which to me is conclusive. It is this:—on the reversion of the bed for the next crop, the manure which is this year placed at the bottom, is transposed and becomes the top:—whence, by the operation of the elements it is soon wasted, "and like the baseless fabric of a vision leaves not a wreck behind." By placing it at the sides of your listing, this evil is entirely avoided, it becomes the centre of your next year's bed; just in that happy medium, whence it scatters blessings on every side. Pine-trash when used without the aid of the cow-pen or stable, (unless when listed over very early in the fall,) should always be so placed; inasmuch, as it comes not into full operation the first year; remaining unrotted for a length of time; presenting a considerable resistance to the tap-root in the spring; and causing the cotton to languish evidently in drought. It is light and easily blown away when brought up to the top of the bed for the next crop; and is certainly *then* of very little account. So much

for the *mode;* now a few words respecting the *quantum.* I presume it is unnecessary to advise any member not to put *too much;* the difficulty has always been with me to get *enough.* I think we are near it, when we put, as a top-dressing over mud, *sixty bushels* to the quarter of an acre. The important consideration next to the *making* of manure, should be, the manner of *getting it out* upon the lands. We have been advised by a very thoroughgoing writer in one of our last "Southern Agriculturist's," that for the manuring of *one hundred and fifty acres*, it is necessary that the planter should have at least *forty-eight oxen;* that while twenty-four are at work, twenty-four should be stuffing themselves with pea-vines. This is formidable; and this writer who signs himself "Exotic," must either be quizzing the natives; or most of the inhabitants of this Island, are certainly in a desperate condition. I differ from him, however, both as to the requisite *number*, and the requisite *rest.* My *four* oxen (and I have had at work but the four) have never rested a single day from labour, from the tenth day of December, (Christmas and Sundays excepted); and they have improved in looks and pace; doing more work at the present day, nearly by double, than they did any day in the first week. I quarrel not with any man for having as many labouring animals as he can afford upon his plantation; but it is throwing "cold water," as it were, upon the hopes of the young planter, and the planter of small means, to over-estimate the necessary expenses of carrying on the operations of a plantation. With these *two ox-carts* and *two horse-carts*, I have *mudded* seventy, and shall this week finish ninety acres with *compost.* They are fed but twice daily, in the morning, before they go to work, and in the evening, after work, liberally; as much fodder is given to them for the night as they can possibly destroy. "Exotic," however, deserves some praise, for the introduction to public notice, of what he terms, "tray-carts: they take off considerable labour in hauling mud, and should be generally adoped.

ART. IV.—*Account of the Culture and Product of a field of Bearded Rice: by* A MARSH-PLANTER.

"North-Santee, April 16, 1830.

Dear Sir—In compliance with your solicitation, I occupy a leisure moment to reply to your inquiry.

Impressed favourably, from the many reports in circulation the last year, as regards the quality and product of the Bearded Rice, I was induced to appropriate a twelve-acre field to the growth of this grain. I selected it as one of my best fields, wishing to give it every opportunity of coming to perfection. The seed I procured was of excellent quality, being almost free of red grains; for it I gave one dollar per bushel. On the 15th of April, 1829, I proceeded to commit this seed to the soil, at the rate of one bushel and a half per acre. I flooded this field the same evening, keeping it immersed until the shoots were green in the rows, when the water was drained off, and kept dry until the 18th of May, when it received its first hoeing; immediately after, it was again immersed, and kept so for ten days, when the rice grew through the water; the water was continued on, and the rice continued to grow most luxuriantly. On the 24th May I removed to the island, from whence I made my usual visits of once, twice or thrice a week, as I thought circumstances required my attention. This field of bearded rice received the customary treatment given to my general crop, which is, repeated hoeings, with the free use of water according to circumstances, which are various, particularly as our marsh lands are more susceptible of local injuries than river lands generally; hence, I am of opinion, from my small portion of experience, that plantations cannot be managed by any other than the rule of experience derived from an ocular view of the plant in its various situations upon different plantations. To return—the bearded rice continued its promise of an abundant crop even after the gale in August, which did affect it very much,) the winnow-house bearing a sad and convincing proof;) and although I had the rice-bird unusually plenty the last fall, I do affirm they never made an inroad into this field. Observing this attentively, I did hope the protruded beard would be an effectual obstacle to these destructive birds. Such, however, I find

not to be the case, and was informed by a gentleman to the south of Charleston, that they had effectually destroyed several acres of this rice which he had planted on the high land.

I kept this rice back until the coldest part of the past winter, when I sent to a neighbouring mill 660 bushels, *(plantation measure)* from whence I received ten barrels of head rice, and fifteen barrels of merchantable rice; the former sold for $1 50, the latter $1 12½ per cwt.—toll taken out of the nett sales. I consequently sent no more to mill, but fed it away, not intending again to plant any of this seed. It also shells very much in the field, and the loss, with the repeated handling is immense. Notwithstanding all these losses, I threshed out 815 bushels of clean rough rice from the twelve acres. Many persons believe that the Bearded Rice and Gold Seed are of equal weight, bushel for bushel; my observation has led me to think otherwise.

A MARSH-PLANTER.

ART. V.—*Observations and Extracts on the Manufacturing of Indigo in Bengal: by* THOMAS SPALDING, Esq.

(Continued from page 254.)

" Sapelo, June, 1829.

The extract from the Asiatic Register, for the year 1809, (which follows) is only valuable as furnishing us with the amount of indigo exported from India in 1809, when it had reached its greatest point; and again in letting us see, that in India, as well as here, there are schemists who, not satisfied with doing well, are anxious to do better, and will recoil from improvements to ancient practices in their speculations. For this employment of copper vessels and hot water, is little else than a return to the earthen vessels and warm water, detailed by Col. Martine, as the ancient Hindoo mode.

"*Arts, Manufactures and Commerce.—Bengal. For the Asiatic Annual Register*, 1809.—*Indigo.*

"In the present state of English commerce, when the enemy is but too successful in closing the continental ports against us, it

is particularly useful to show the advantages and resources which may be derived from our colonies, with a view to encourage efforts towards furnishing articles which may be derived from foreign and even hostile countries; supplies from whence are alike expensive and precarious. In the year 1786, Britain was almost wholly dependent upon France and Spain for indigo: the imports of this article from the East-Indies at that time, being only £57,000 in value. By subsequent encouragement, the supply from thence has annually increased to such an extent, that in 1809 the quantity was, in weight, 4,740,926 lbs. and in value, £1,105,678. Thus the country is rendered independent of foreign power for a material so necessary to our manufactures.

" 'Sir—Enclosed is an extract of a letter, dated 8th of June, 1790, from Dr. Roxburgh, of Samulcotta, accompanying a specimen of indigo obtained from the leaves of a tree, native of the lower regions of the mountainous tract forming the Rajah Mundri frontier. This, in the estimation of Messrs. Harris and Haven, promises to become a valuable acquisition, and its value farther enhanced by the consideration of its rising in a sandy or sterile soil. That, from being perennial, (like the Sumatian species) and attaining the stature of a tree, affording a permanent stock and resource against the devastations and failure to which the cultivation of the ordinary annual species are, from their nature, exposed in disastrous seasons. From Dr. Roxburgh's description of this tree, it appears to be of the genus, Nerium, and will, probably, be found on our south-west frontier. Of the seeds received, part have been sent to the collectors of Bhaagulpor and Gio, and some hundred plants are now raising in the Company's garden; so that we shall be enabled to avail ourselves of this additional resource, by a general distribution to the several indigo planters within the provinces, of which public notice may be given, to take place during the present season; by the month of August, we shall also be enabled to obtain a comparative estimate of its productive qualities, with the other species now in use. Should the avocations of administration permit an official examination of the situation and soil of the hilly tracts on which the residence of the collectorship of Hidjelli is situated, as described in the diary of the tour through part of that tract in the year 1780, submitted on the occasion of an imperfect attempt to examine its maritime productions, it will be perceived that, that uncommonly situated region is peculiarly adapted to the cultivation of this species of indigo. But I learn from the collector, that the greatest part of this province (although in extent between twenty and thirty coss) is productive of little or no revenue to the self-called possessor, the Ranni of ———; but I am wandering from the only subject which can entitle me

to occupy the attention of the board—the report of a new species of indigo brought under notice by the discernment and researches of Dr. Roxburgh, and I crave pardon for a digression from the subject into which I have been involuntarily led. I have the honor, to be,' " &c.

" In consequence, a paper was printed in Calcutta by authority, containing a clear and satisfactory account of the method of making indigo from the plant indigo—*fera tinctoria*, as practised in Singatolla, near Malda. On St. Helena, and in the West-India Islands, there is a great abundance of soil and situation favourable to the culture of this tree, viz. hills and the inferior regions of mountains where there is little else than rocks, stones, and the most barren soil, such being the habitation where it is mostly found in Hindostan. It has been ascertained that the natives of Vizagapatam and Gangam, and other districts in Carnataka, have been long acquainted with the quality of its leaves.

" Dr. P. Rusole wrote Dr. Roxburgh from England, that among the papers of the late Dr. G. Campbell, who was a surgeon on the Madras establishment, and died of wounds received in the battle between Colonel Baillie's detachment and Haider Aali, in 1780, there was found mention of the tree, and that the natives made indigo from its leaves. In India, as has been already observed, the leaves begin to be fit for manufacturing in the month of April, but they have been found to yield a better colour in May or June, which is the hottest time of the year. (In the shade, the thermometer, during the heat of the day, is generally about 100°, and often rises to 115° if exposed to the sun. On the rocky soil where the Nerium grows, it ranges from 140 to 150°, an astonishing heat for vegetation!) About the end of August, the plant begins to draw towards a close for the season; the leaves acquiring a yellowish, rusty colour soon fall off, without being succeeded by others, or in a trifling degree till next season, so that with the plants in a wild state, the length of the season for making indigo therefrom in India, can only be reckoned at five months in the year. The leaves raised from seed in a garden, did not yield colour till several years old, and then in a small degree, and of a quantity inferior to the old wild plants in their natural soil; it is the same with the young plantations in Bengal. If the leaves are culled from the middle part of the shoots, the indigo is better than if they are taken promiscuously. Nothing like indigo could ever be extracted from the tender shoots of the Nerium, when deprived of their leaves, as is not the case with the common indigo plants. The leaves being collected, for instance, on the preceding day, are put into coppers full, but not pressed down, and then the veesels are filled with cold, hard, clear water, to within two or three inches of the brim, which space must be left, to allow for the bulk enlarging by heat, fully as

much as in the common indigo vat by fermentation. The fire is then lighted, and must be maintained rather briskly till the liquor acquires a deep green colour, when viewed in the vessel; but if taken up and poured out, it will appear of a pale-bright, greenish yellow; the leaves will begin to assume the same colour, and the heat of the liquour will be from 150 to 160 degrees of Fahrenheit's scale. The mass must be constantly stirred, or the bottom will be over-scalded before the surface is ready; the motion moreover, serves to expel the fixed air which forwards the operation. The fire must be withdrawn or suffered to die away; and all the liquor should be drawn off through a hair cloth into the agitation vat, where it must, while hot, be agitated in the common way for half an hour, then it must be mixed with from 1-70th to 1–100th of strong purline water, prepared in a contiguous cistern which is to produce granulation and precipitation. The supernatant liquor is then let off, and the rest of the process conducted like that of the common fermented indigo. If the process has been properly conducted, the liquor will run of a Madeira wine colour, and the produce of indigo when dry will average about one pound from every 250 pounds of the green leaves; but this proportion will vary according to weather and season. The operation on a large scale is susceptible of being performed three times a day, as the scalding requires only about three hours, and the agitation, &c. not more: so that by the time the former is completed the fecula of the preceding brewing is nearly ready for removal from the agitation vat into a small cistern for mixture and precipitation. The liquor is finally withdrawn by scuppers, and the fecula put into bags to drain. M. de Cossigny, in his treatise on indigo, recommends washing the moist fecula with warm water, in which a small quantity of vitriolic acid has beed mixed. Marine acid may answer the same purpose, but as it is weaker, a larger quantity must be used. Nitrous acid has not been found to answer as well, and it rendered this indigo porous. Any quantity of Nerium indigo can be produced in the districts already mentioned, where 250 works, each making 4000 pounds in the season, would give a million for the whole, which may be fairly valued at two rupees or five shillings per pound. The preceding calculation is by no means exaggerated, and to the extent of the Nerium district on the coast of Coromandel, may be added the Malaba coast; information having been received that Dr. H. Scott, of Bombay, had discovered the same plant upon the island of Salsett.

"The foregoing observations lead to recommending to our colonial manufacturers, not only to turn their attention to Nerium, the preparation of which may be carried on alternately with that of common indigo, the seasons for each being different, but moreover to adopt the scalding procees generally in preference to that of fermentation. Besides, the superior quality of the

indigo so obtained, that process presents others, the following comparative advantages:—1. The produce is larger. 2. The health of the labourer is not endangered by the effluvia of putrid miasma. 3. The heat expelling most of the fixed air, renders a small degree of agitation, and little of the precipitant necessary. 4. The operation is susceptible of frequent repetition. 5. The indigo dries quickly, without acquiring a bad smell. 6. Indigo so prepared has not the flinty appearance common to fermented indigo; but in softness and levity is equal, or even superior to Spanish Flora.

"The useful publication from whence this account of Nerium has been abridged, contains also the description of a species of Asclepias, from the leaves of which the Bunnah people are said to extract a green dye; being a larger twining, shrubby plant brought from Pegu to the botanic garden in Calcutta, in 1795, by Dr. Buchanan, which Dr. Roxburgh names Asclepias tingens. Observing, however, that his experiments to obtain the colour above mentioned, failed of success, possibly from want of sufficient information. Some other communications from that scientific person, contained in the same book, and relating to medical productions of India, are very valuable, and will deserve republication in this Register; but the requisite space being wanting, they are reluctantly omitted."

I have lately received a report upon indigo, by Matthew Carey, of Philadelphia, in which, he gives a Mr. Dalrymple, now in New-London, (whom he states to have been a great maker of indigo on the Ganges,) as the informer of Mr. Gibbs as to the manufacturing of indigo from dried leaves, by warm water in copper vessels; such a process may, in the small way, have existed at Madras, in making indigo from the Nerium, the tree discovered by Dr. Roxburgh, to give a colouring matter from its leaves; but is not the process in Bengal, as you will see from, finally and lastly, three extracts from the letters of Bishop Heber. The first, describing a succession of brick cisterns, (brick or mason cisterns being used because wood cannot be obtained) in which the indigo is macerated or steeped; and the two last, giving the character of the persons so engaged, as being low and worthless in the extreme, and subject to being transported at the will of the civil or military chiefs of their district.

And here I would observe, that kiln-drying is only used because indigo is made in India during the rainy monsoon,

when the heavens above and the earth beneath are saturated by water; but no such kiln-drying is necessary here.

"*Narrative of a Journey through the upper provinces of India, by the Rt. Rev. Reignald Heber.*—"We moored at about half past six, after a very hot day, and a fatiguing one to the poor men, at a place called Bunybunya, a desolate sandy spot, but which promised good air. On landing, we found that beyond the immediate vicinity of our birth, the country was really pretty. A considerable indigo work, with an European bringalow, was at a little distance, the owner of which was gone to Kishnagm, but which afforded us an amusing and instructive occupation in walking round the works, and seeing the manner in which indigo is made, by maceration in water in a succession of brick cisterns, and at last by kiln-dying to evaporate the moisture from the dye."

Extract of a letter from Bishop Heber, to the Hon. Charles Williamsloynn, March 1, 1825.—"The English in the upper provinces are, of course, thinly scattered, in proportion either to the multitude of the heathen or the extent of territory. They are, however, more numerous than I expected, though there are very few, who are not in the civil or military employ of government. The indigo planters are chiefly confined to Bengal, and I have no wish that their number should increase in India. They are always quarreling with and oppressing the natives, and have done much in those districts where they abound, to sink the English character in native eyes. Indeed, the general conduct of the lower order of Europeans in India, is such as to shew the absurdity of the system of free colonization which W——— is mad about."

To the Dean of St. Asaph.—"But the power of deportation is, I am convinced, essential to the public peace. Many of the adventurers who come hither from Europe, are the greatest profligates the sun ever saw; men whom nothing but despotism can manage, and who, unless they were really under a despotic rule, would insult, beat, and plunder the natives without shame or pity. Even now many instances occur of insult and misconduct for which the prospect of immediate embarkation for Europe is the most effectual precaution or remedy. It is, in fact, the only control which the company possesses over the tradesmen and ship builders in Calcutta, and the indigo planters up the country.

"Believe me, my dear Sir, ever your obliged and affectionate,

"R. CALCUTTA."

There was one other extract from Asiatic publications, which I wished to make for you, but have sought in vain for a paper, which I very distinctly remember to have read three or four years ago, and which gives the details of the

present Bengal process, which, in no material manner, differs from the instructions contained in General Floyd's letter, except in taking the mud or fecula which has subsided to the bottom of the beater, after the water is drawn off, and instead of straining it through bags, carrying it to copper boilers, where the redundant moisture is evaporated without wastage, and without permitting the residuum to go into fermentation, which might impair its quality.

This copper vessel is all we have to add to our ancient apparatus. If we take care, that the water we employ is pure, we may expect to make indigo as good as the Bengal. Our river swamp-lands, in many points, resemble the river lands of Bengal, and will give two crops or cuttings in the year, instead of one, because the monsoon prevents the second in India. The water, too, of our rivers, after settling, will be quite equal to the water of the Ganges, for the manufactory, while the whole apparatus, for the making in this country of 12,000 or even 15,000 lbs. of indigo, will cost not more than $1200, instead of $6000, as given in the Bengal report.

As to the prejudice against lime, no indigo was ever yet made without it; the operation of beating, would, without lime, more radically mingle substances contained in the water, and not separate them; in all human probability, a vegetable fermentation would take place, which might even change and destroy the colour. The lime too, is employed in so small quantities, that it certainly could never have constituted any portion of the residuum found in indigo by Dr. Cooper; for water holds suspended in solution, an hundred times the quantity of lime that is employed in this operation. But if any doubt remain, you may see in the Annual Register, for the year 1811, a communication from a distinguished dyer, to the Bath Society of England, upon the growing and preparation of the delicate blue from woad, that lime in very considerable quantities is employed, and is absolutely necessary to prevent a fermentation, which would destroy its colour. The quantity there directed, is many times greater than is employed to separate the fecula of indigo from the water in which it is suspended.

This communication is made to you, with the hope that General Floyd's letter which, I am quite sure, contains all the instructions which are necessary for the profitable cul-

ture of indigo in our Southern States,) may be allowed to pass on to your readers, with all the weight and consideration that it merits. THOS. SPALDING.

ART. VI.—*Account of the Management and Product of an acre of Sugar Cane: by* EDWARD BARNWELL.

(Communicated for publication by the Agricultural Society of South-Carolina.)

Sir,—By the invitation and direction of the Members of the Agricultural Society of South-Carolina, I have the honour of forwarding to you, their Secretary, a certificate of the product of one acre of sugar cane, cultivated by me upon Kean's Neck, Prince William's Parish.

In further compliance with their resolution, I accompany the certificate with the following statement of the method of culture, quality of soil, &c. &c.

The situation of the land, is such, as usually is considered the best for black seed cotton. Having been under continued cultivation for near thirty years, and having received during that period, but little or no manure; there was spread upon it, the last week in February about 100 mule cart-loads of compost, formed of trash from the woods, corn stalks, and cotton seed, thrown into a cow-pen, a few weeks before used.

The land was cultivated in corn and pumpkins the year previous, and as soon as the manure was spread, it was formed into broad, flat beds, five feet apart.

A trench four inches deep was then made, and the cane in pieces with four and six joints, was laid six to ten inches apart, with the eyes sideways.

Its first working was in the last week of April, when two furrows were run with a bull-tongue plough though the alleys, followed by the hoe cutting, and hand picking, from the young shoots, the scattered bunches of weeds and grass, that escaped the plough, commonly called a flush hoeing. The shoots were at this time about knee high. The last of May, the alleys were again broken up by the bull-tongue plough, and the beds hauled up to, by the hoe, as the shoots were now of sufficient growth to bear the earth to be drawn to them, the height of the plants about waist high.

The beginning of July, the beds were a second time banked up; but the plough not used, as the shoots were too high to be bruised by the plough horse, or driver walking among them.

The first joint perceived to be formed was on the first of August. On Monday the 9th of November, the cane was cut down with hatchets, and counted in the presence of the gentlemen, whose certificate is herewith presented and found to produce 23,150 canes.

Although, on the 1st of November, the frost was so severe as to form thin flakes of ice, the cane leaves were scarcely affected.

However, on the nights of the 10th and 11th, the cane lying on the ground, that the leaves might wilt before being mattrassed, more than half were destroyed, as seed cane; but, not at that time so much injured as to prevent their making sugar.

A small mill for one horse, having been erected within a few weeks, I have the pleasure of presenting for your inspection several small specimens of sugar, and one of syrup.

As early as the 1st of December, I found the cane much acidulated by the warm covering of trash and earth used in matrassing it. During the last fortnight, I have opened the mattrasses, selected the canes that will answer for planting, and boiled the rest into syrup.

The canes presented to you are a fair sample, of the acre cut and of the condition of the vegetating principle now left. I am inclined to think our best soil for cane will be such land as is best adapted to the culture of corn, and state further, that the cane is as easily cultivated.

EDWARD BARNWELL.

To Charles E. Rowand, Esq.

ART. VII.—*Account of the relative Strength of the Cane Juice at Pinckneyville and Baton Rouge: by* BENJAMIN FARRAN YOUNG.

(Extract of a letter to the Editor, dated Pinckneyville, Feb. 22, 1830.)

* * * * * The very polite manner in which you have solicited contributions to your valuable paper, has almost

tempted me to give you something in the way of experiments, that I have been making on the Sugar Cane and Indigo. Of the latter, I planted some of the Guatemala seed last spring, which promised finely, but owing to its coming up late, and the early frost last fall, it did not go to seed; when in blossom, I made a few fair samples from the dried leaf, agreeably to the directions of the Marquis De Fougere. If attended with no inconvenience, I should be glad to have you send me a few pints of the Carolina seed, particularly the wild. Of the Sugar Cane I have planted a few acres, Ribbon, Creole and Otaheite. I am satisfied of its maturing sooner on rich high lands, than on alluvial bottoms, from a few experiments made on the juice by Boumé's Pesse Sirops, or Mr. Spalding's Hydrometer. After which, I proceeded as low down on the coast as Baton Rouge, and found that none of their juices gave the same quantity of saccharine matter, as that grown by me on the hills. To give you an instance—after the severe frost of the 23d of November, my Creole cane gave me 9°, when that on the coast gave 7°. My Ribbon cane gave me 8° on the 11th of October, without any frost, and after the frost of the 12th of November, (the first we had) 10 and 10½°, when that on the coast gave only 9°, after the severe frost of the 23d of November. The Otaheite was so green that I could get no sugar from it, giving only 6½°. From the others, I made a few parcels of pretty good sugar—from the Ribbon as early as the 12th of October.

I read G. J. F. Clark's communication on the cultivation of Havana tobacco, with much satisfaction, as I have some of the Varinas tobacco seed, which I shall plant this spring, said to be superior to the Havana for smoking. In conclusion, I have only to remind you that our country is new, and agriculture in its rudest form, as an excuse not only for having nothing of value to contribute to your paper, but a good one for expecting every thing from our older and more experienced neighbours. To which you will please add my want of the requisite talent, and permit me to subscribe myself, yours, &c.

BENJAMIN FARRAN YOUNG.

ART. VIII.—*Account of a Native Grass, which affords excellent pasturage during the winter and spring months: by* WILLIAM TERRELL.

"Sparta, February 6, 1830.

I received your letter in due time, and have delayed thus long, that I might accompany an answer with a parcel of the seed and a specimen of the grass, (about which you desire information) in its now growing state. From the short time that I have paid attention to this grass for the purpose of propagating it, I fear that I can hardly give you such information as may determine its value; and as I know nothing of botany, I cannot give you its distinctive character. The grass is doubtless, a native, as I have seen it growing in the neighbourhood of this place upon inclosed creek bottom land. The stock from which my seed originally came, grew on the banks of the Savannah river, and were procured by a Mr. Burton who then lived there, some twenty years ago; since which time, he informed me he had kept in stock by putting down an acre or more wherever he had lived. The cultivation of foreign or native grasses for hay, so far as I am informed, has been but imperfectly attempted, and always unsuccesfully in this state; even for pasture. No pains are ever taken to prepare the ground, and, consequently, nothing that deserves to be called an abundant pasture field, is to be seen in our plantations. The labour and attention necessary to produce crops of grass for hay, and, possibly, the proper preparation of pasture lands may be incompatible with the successful cultivation of our great staple, (cotton) it is, therefore, that I have looked with particular satisfation on this native, as being likely to afford either hay or pasture without much attention, and no other labour than is necessary to prepare the ground, and put in the seed. The qualities which I think may be said to recommend it, are these: it is perennial, and grows well during autumn, winter and spring—it grows well on any tolerable soil, though it prefers moist land; it keeps possession to the exclusion of all other grasses; it grows tall enough for hay, and produces abundance of seed, the seed-stalk growing five feet high, and resembles rye; it may be sown broadcast or in drills, and though small and unpromising when it first puts up, it soon grows vigorously. I think from the

seeds and blades sent, you will be able to determine if it is the same kind of grass you have referred to in your letter.

The little plat which I have, was sown in my garden in drills, and no attention paid to it, that I might determine its hardiness and its aptitude to extend itself either by branching from the root or by seed. The second year it pretty well covered the ground, extending itself in both ways. I will only add that horses and cattle eat it freely.

In reference to your inquiry about the kinds and use that I may have made of manures, I can only say that I have made no experiments worthy your attention, saving and applying only such as were formed about my stables and cowpens, and these, I dare say, injudiciously.

I remail, yours, &c.

WILLIAM TERRELL.

Note.—On examining the plants and seeds of the grass sent us by Mr. Terrell, we find it to be the same as that to which we have under cultivation, and to which we alluded in our review of "Twamley on the Dairy," see page 263, of the current volume. We think it highly deserving of more extended cultivation. It will, on good soil, afford as excellent a pasturage during the winter, as any grass we have, either foreign or native, will during the summer. We do not venture this opinion rashly, but after having it under cultivation for six or seven years.—*Ed. So. Ag.*

ART. IX.—*On the Culture of the Grape Vine, with Observations on the practice recommended by various writers: by* N. HERBEMONT.

"Columbia, (So. Ca.) March 30th, 1830.

Dear Sir,—I have been much pleased to see that in several numbers of your most valuable periodical, on agriculture, Mr. Geo. J. F. Clarke, "attempts to simplify the agricultural process of the grape;" and when we see gentlemen of such intelligence elucidate and simplify the various processes of a culture which has hitherto been very complicated, and undoubtedly mingled with practices which took their origin in ignorance and superstition, we may hail the auspicious beginning of an era favourable to the subject taken in hand. Notwithstanding the numerous European works on the cultivation of the grape, and some of those, by persons of the very highest merit in science and expe-

rience, if it be presumptuous, it may not be predicted with the less probability in the result, that the best treatises on this most interesting subject, may hereafter be the growth of our own free country, unshackled as it is by the habits and prejudices of past ages. We must, however, admit our present great inferiority, and ever acknowledge that we are undoubtedly indebted to them for the great leading principles of the art; but untrammelled as we are with the rubbish of the ancients, if we have wisdom enough to retain nothing from them but what is really reasonable and according to nature, may we not raise thereon a superstructure comparatively free from useless and even injurious additions, more calculated to disfigure and render it less fit for its purpose, than if left to conform with nature in all her simplicity, beauty and usefulness. Are we not, therefore, to congratulate ourselves, when we see that the good work of reformation has been commenced, and hail the prospect of success, when reason, and nature, joined to science, have begun to examine the subject, and to discard all futile appendages. Let Mr. Clarke, therefore continue, and be not displeased if, in any thing I may say, I seem to oppose any of his positions; for my aim is only to elicit truth by discussion, but more particularly to have it proved by varied and multiplied experiments. We must also invite most earnestly to our aid as much help as possible from those who have made the natural sciences their study, and also those who can conveniently add the practice to the theory, and publish their results. A little attention to this subject, will show it to be most worthy of all the trouble and expense that may be bestowed upon it. As to the making of the wine, after we have obtained the fruit in its most perfect degree of maturity, European writers must be our best guides; because more chemical knowledge has been bestowed on this branch of the art than on the culture of the vine; for it is seldom that we see men of sound and scientific acquirements subject themselves to the hardships of manual labours in the field, by which only, or by very close and attentive superintendance, true practical knowledge can be obtained.

It is to be feared that the public feeling is not yet sufficiently alive to the vast and manifold benefits to be derived from the extended culture of the vine in the Southern States; but we

cannot too soon open our eyes to our many millions of acres of vacant, useless land, capable of maintaining, in comfort a population more dense than the most thickly settled parts of our richest soils. This culture has the vast advantage over any other now practised in this country, that it is equally susceptible of being formed into large establishments by those who may be able and willing to form them, and of yielding to the proprietors more than any thing else which has as yet been tried here, and, (which may be of incalculable benefit to the country,) of being divided into numberless small establishments, each of which is capable of supporting a family, if not in affluence, at least in comforts, yielding in the aggregate, an immense revenue to the country by the great commerce it must give rise to; but the greatest advantage may be still in having a very great increase of population of honest, hardy and independent people, where we have now only a desert. I have heard a fear expressed that such people may leave the country in search of richer lands in the West; but there is little danger of this; for the cultivation of the vine offers so many attractions in itself, that men are seldom known to abandon it; and surely they will scarcely abandon a vineyard yielding them a comfortable subsistence in a most healthful country, affording besides many other advantages.

As far as my experience goes, it fully confirms Mr. Clarke's first part, (Vol. II. pp. 510–512,) except the transplanting of "vines when loaded with foilage, without losing their tender sprouts that are not bruised," &c. for I have not tried this. Too much attention cannot be given to the reading of his second number, (Vol. III. pp. 17–19.) It is possible, however, that Mr. Clarke may go somewhat too far in proscribing manuring altogether, even in the poorest land. The generality of writers positively declare that the best and most delicate wines are produced without the assistance of manures, and they exclude most particularly stable manure. This I believe to be most true; nevertheless, I think it commendable to enrich the soil, at the time of planting, cuttings particularly, with compost formed of good vegetable earth, the scrapings of the cow-pen, ashes, rubbish containing lime, &c. The object in this is evidently to give the plants a vigorous growth, and induce it by any means, to send its roots deeply in the well loosened soil, after which they will be suffici-

ently within the reach of abundant moisture, and thereby resist with ease our long droughts and great heats. This, at least, has of late years been my practice, and I have had no cause to complain of it. I cannot pass over this part seeming to recommend the practice of Catalonia and other parts of Spain, of using merely a "crowbar" or an "auger" to make the holes in which the vine is planted, unless the ground has been previously trenched to the depth of at least two feet, and the soil is naturally very light and sandy, and not at all disposed to become hard by pressure. By making a hole with a crowbar, the hole becomes coated with a hard crust which the very tender roots that are first produced by a cutting, must find some difficulty to penetrate. I much prefer in every case to take out the earth with a spade, place in the cutting, and return the earth with a general and gentle pressure upon it with the foot to bring it in contact with the plant. In very stony ground, however, the crowbar may be the only practicable way, and this may be the more admissible that the soil between and below the stones, is usually sufficiently soft and friable to receive the young roots; yet, I certainly would prefer, wherever it is possible, to make deep holes to plant the vine in, whether rooted plants or cuttings. It appears to me that the analogy between the two countries is not perfect, far from it; for in Europe the soil has been in cultivation for centuries, whereby it has been stirred up and mixed very often, which may give it a sufficient preparation to receive the plants. Here, our soil is such as it comes out of the hand of nature, which may be the best for natural operations in our forests, where the ground is shaded and covered by the decaying leaves and other detritus, by which it is kept cool and moist, so that the native vines and other plants are not exposed to the drying winds and sun, and have, therefore, a plenty of time to send their roots deeply into the earth. We ought, therefore, to prepare our soil for planting, so as to enable the plants equally to resist the exhausting influence of the wind and the sun.

As to the manner of planting recommended by Mr. Clark, at the distance of about six feet, with the view of removing a part of the vines when the extent of their growth may require it, I consider this a good practice; but I think fully double that distance, for vigorously growing vines, is better; for, although the superfluous ones may be taken up

and planted elsewhere, this is attended with great labour, which I can testify, having been engaged at it a great part of this winter and spring. My vines had been originally planted much too close, not with the view of taking them up (as I have done); but through ignorance of the necessity of planting in this country, much farther apart than in Europe, especially as the kinds found as yet to succeed best here, are such great growers, that it is impossible to confine them to small spaces. If they are planted, therefore, twelve feet apart, the intermediate spaces may be cultivated while the vines are young in something else, such as pease, small grains, &c. taking care not to plant these articles too near the vines. A better way still, which my experience, particularly of the last summer, has suggested to me, would probably be of planting two or three rows at a good distance, then to leave a space unplanted at least equal to that which is planted, then plant two or three rows followed by a similar vacant space as above, and continue to till the ground as thus planted in strips of two or three rows of vines. The vacant strips between the vines may be cultivated in any thing of low growth, so as not to interfere with the free circulation of the air among the vines. The last summer being very wet, the grapes rotted much wherever the air had not a very free circulation, so that the ground could dry in a short time; but a few vines which were planted in two rows only, and at the distance of about 80 or 100 feet from other vines, were almost entirely free from rot; so much so, that two of these vines produced 30 gallons of wine, which was at the rate of near 1200 gallons per acre. This was in my garden, and the quantity of rotten grapes could be accurately judged of by the density of the obstructions to a free circulation of air. This is a most important fact which tends to give an almost full certainty of great crops under almost any circumstance; for besides obviating the rot in the grapes, there is no doubt that vines being trained high, about seven or eight feet, are scarcely at all liable to be injured by late spring frosts—getting rid, by the same means, of the two most dangerous enemies of the vine. Old vines put out later in the spring than young ones, so much so, that the vines above alluded to, have not been at all affected by the frost nor the rot for seven or eight years, excepting by that unparalleled frost in April, 1828. These vines are trained horizontally over head, on

coarse trellis work, seven or eight feet above the ground, supported by rough lathes singly split out of dead pine trees.

This high training may be objected to, particularly, for many of the imported vines which are not of a sufficient growth for this purpose. I am not prepared to assert that those vines of weaker growth will not succeed well according to the European mode of planting and training; giving them, however, more distance and more height than in that country, I believe some of them will prove most valuable acquisitions. Neither am I prepared to accede to the opinion expressed by many, that we shall have to depend solely on our native vines for making wine. Many of our native vines will undoubtedly be found to answer this purpose very well; but it remains yet to be proven that they must be exclusively cultivated to secure success. Among the numberless kinds that have been and will yet be imported from abroad, time will undoubtedly show several, at least, as valuable as any of the native ones, as it has already been the case with a few. When only a few persons are engaged in making experiments on such an extensive subject, many years will be required to ascertain fully the properties of only a few kinds, whether native or imported. It is to be hoped, that so interesting and important a matter will attract public attention, and that the very heavy burden of making labourious and costly experiments, that must redound to incalculable public benefit, will no longer be suffered to be borne by a very few unassisted individuals.

There is, perhaps, nothing so generally asserted by almost all writers on the subject of the cultivation of the vine, for the purpose of making wine, than this; that to make a good rich wine, the grapes must be produced near the ground, or as some express it, near the roots. I do not recollect now a single exception. It requires, therefore, a great deal of hardihood, even to suspect that this may not be true. Yet, I unhesitatingly say, that I do not believe it to be true, except, perhaps, in cold climates, where the reflection of the heat of the earth may be necessary to give the fruit a sufficient degree of maturity and saccharine matter to make good wine. The universality of this prejudice, if it be a prejudice, may be owing to this, that almost all the works that have been written on this subject, were written in such lattitudes as may have made it necessary to have the grapes as near the ground as convenient. Be

this as it may, the fairest and largest, and, I may say, perhaps, ripest grapes are most usually found the farthest from the roots; and so far as my short experience goes, I have not observed a greater deficiency of saccharine matter in grapes grown at a great distance from the earth, than in those that grew near it, while the former were much more free from defects or from rot. I confess that I do not fully understand the reasoning of most of these writers, as to the elaboration and connexion of the sap preparatory to its being converted into grapes, containing much sugar, &c. I suspect that neither they nor we cannot, as yet, see very clear into these matters; but, if there be any thing like truth in their speculations, it makes rather more against their hypothesis than in its favour; for the elaboration of the sap must be much more perfected by going through a long line of vessels to the end of a long vine, than merely passing through a few inches of it. Neither do I, therefore, deny the propriety, or even the necessity of short winter pruning. This does bring the vine, in some degree within the intention of these authors; for although the fruit bearing part of the vine is not thereby brought near the root, it is brought near the old wood. The objects I have in short pruning are many, the principal of which are, that, without it, the vine would be much too thickly set with foliage, too many branches and too much fruit of a small size, and divided into too many small clusters, instead of a smaller number of larger clusters of larger berries, and that the latter would in a great degree produce on wood that had not acquired a sufficient degree of maturity to bring it to perfection, and, also, that without this short pruning, the vine would be extended to inconvenient lengths chiefly composed of slender, weakly and puny branches, unable probably to resist the great changes of temperature. To this cause, (the want of pruning) I attribute the general appearance of the wild vines in our forests, where a great deal of dead wood is always found; and this may be the mode of pruning that nature adopts.

This brings me to notice Mr. Clarke's proposal of leaving at once, to a young vine, the height intended for it. (See Vol. III. pp. 85–86.) Now, Mr. Clarke, you are a much bolder man than I am, and while (in the cultivation of the vine, according to the European methods) I am a sceptic, you are a right down infidel, and were you in

Europe, you would undoubtedly be, at least, excommunicated. My fear, as I have said before, is, lest the wood might be deficient in maturity and size. Otherwise, it would be a great deal of time saved that is now lost, even by my deviations from the learned practices of the Eastern world. You may be right, however, and I shall try it fully.

It is most desirable that this gentleman, and as many others as can be enlisted under the banners of so good a cause, should continue not merely reasoning, but experimenting on this subject, and enrich the world with, not only their lucubrations, but chiefly with the full results of their experiments.

It is also most desirable that some persons should turn their serious attention to the providing, not a substitute for corks; for I believe there is no such a thing; but of cork trees themselves. These may be obtained in abundance in the South of Europe, and it is well worth the cares of some of the Agricultural Societies, or no doubt, of the government itself, to procure them and have them largely disseminated throughout the country for the benefit of future generations.

If, Mr. Editor, you think these desultory observations are worthy of the public eye, you will oblige me to publish them. I am very respectfully, Sir,

Your obedient servant,

N. HERBEMONT.

PART II.

REVIEW.

ART. I.—*Essays on the Management of the Dairy; including the modern practice of the best Districts in the Manufacture of Cheese and Butter. Deduced from a series of observations made during thirty years' practice; by* J. TWAMLEY, and Others. London, 1816.

(Continued from page 265.)

IT is the usual practice in most places to milk cows twice in the course of twenty-four hours, which should be as nearly as possible equidistant. Our author is of the opinion that they should be milked during the summer at least three times.

"For it is an important fact, confirmed by the experience of almost every housewife in Scotland, that cows, when milked three times in the course of twenty-four hours, will yield more milk in point of quantity, and of as good, if not better quality, than they will under the common mode of milking in the morning and evening."

In a note, he states, that the actual increase has not been ascertained, and that there is considerable difference of opinion: "by some it is estimated at full one-half of the whole product, while others make it somewhat less,"—not, however, satisfied with this, he suggests the propriety of instituting some experiments to ascertain, not only the actual gain, but whether it would not be advantageous to milk them *four* times in the course of the twenty-four hours. We have not ourselves ever made any experiment on this point, nor have we met with the record of any, we, therefore, can neither recommend or condemn the practice; one thing, however, is certain, and ought to be borne in mind, and that is, that as this additional quantity of milk must necessarily be subtracted from what would have proved nourishment for the cow, she must be supplied much more liberally, than would otherwise be necessary. She should have not only as much as she can eat, but be tempted by the variety which may be offered to her, to consume more, nor should any food be given in large quantities at the time, as she will refuse to eat what she has once fed on, unless compelled by severe hunger.

One other thing to which the Diaryman should pay some attention, is, that his cattle has not only a sufficient supply of water, but that it be the purest he can obtain; this is often neglected,

and cattle are driven to stagnant ponds, where thirst compels them to drink of water, sufficiently bad to taint the whole atmosphere with miasma. It is impossible for them to thrive when so important an article of daily consumption is forced on them in such a state, and they will consequently, take as little as possible: merely as much as will quench the thirst of the moment, instead of the quantity necessary to supply the waste of the system. With respect to this our author observes:—

"Pure water is an article of essential importance in the food of cows; which, if they be well supplied with it, kept clean, and laid dry, will produce a much larger quantity of milk, and at the same time, afford a quantity of rich manure, that will abundantly compensate the trouble thus bestowed upon them. One single instance, which occurred within the sphere of the author's knowledge, may suffice to confirm this remark: He knew a man, who attained to great opulence, by attending to these circumstances, and particularly to the very important one of having a continued supply of the purest water which could be procured for his cows; nor would he, on any account, permit a single animal to set a foot in it, or suffer it to be tainted, even by the breath of the beasts."

Remarks similar to these have been made by many of the best writers on this subject, and they are certainly worthy of consideration.

The selection of proper persons to milk the cows should be made with care and judgment, for even where these matters are attended to, with more care than with us, and where the servants have both character and maintenance at stake, all are not found worthy of the trust, or capable of executing it: much less, likely, shall we be, to find among our servants, who are proverbially careless, and very often designedly neglectful, such as will faithfully perform with care what is required of them, and yet, unless some faithful one can be obtained, a serious injury will ensue. Inspection on the part of the proprietor may do something towards, but cannot remedy the evil, yet a rigid inspection should be instituted and persevered in, even when one, supposed to be faithful, is obtained. The importance of this, and the injury likely to be sustained by neglect, is set forth in the following extract, which should be carefully treasured up, by all interested in the dairy.

"Much of the profits of the dairy, however, will depend upon the skill and fidelity of the person employed in milking. On this account we would recommend no dairy-owner to trust entirely to his servants, but frequently to see themselves, that their cows are milked clean: for, if the whole of the milk, which the cow can be made to yield at the time, be not completely taken away, the quantity left will be re-absorbed into the system, and no more will be generated, than is necessary to supply the quantity actually drawn off. For instance, let us suppose that half a pint more might have been drawn off at any given time, not only will that half pint be lost for once, but there will be half pint less generated for the next milking. Let another half pint remain for the second milking; a whole pint less will be produced for the third milking; and one might proceed, until no milk at all be generated, and the cow become entirely dry. Whereas, if the milking be fairly performed, the cow might perhaps ultimately

generate even a larger quantity than the first; or at least might have continued to afford nearly the same quantity for a great length of time, perhaps for many years, without much abatement, if she were rightly managed in other respects.

"An additional reason why the owner of a dairy ought to be extremely cautious in the choice of his milkers, and also vigilantly to superintend them himself, is this, viz. that the *quantity of milk yielded* is influenced by the manner in which the operation of milking is performed. If it be done harshly, it becomes painful to the cow; but, if gently performed, it seems rather to give pleasure: and, as the animal possesses the singular faculty of being capable of retaining her milk at pleasure, it is of special importance to the dairy-owner, to engage such milkers only, as are gentle and pleasing to the animals themselves. Many instances have occurred within the author's observation, in which cows would not let down a single drop of milk to one dairy-maid, which let it flow in abundance whenever another approach them; exhibiting unequivocal marks of satisfaction in the one case, and of sullen obstinacy in the other. For the same reason, when cows are *ticklish*, they should be treated with the most soothing gentleness, and never with harshness or severity; and, when the udder is hard and painful, it should be tenderly fomented with lukewarm water, and stroaked gently, by which simple expedient the cow will be brought into good temper, and will yield her milk without restraint. Lastly, as it sometimes happens, that the teats of cows become scratched or wounded, so as to produce foul or corrupted milk, whenever this is the case, such milk ought on no account to be mixed with the sweet milk, but should be given to the pigs without being carried into the milk-house; lest, by continuing there, it should taint the atmosphere, and consequently prove injurious to the rest of the milk."

We come now to the most important part of our subject, viz. The management of the milk and manufacturing of butter.

This is not so easy a matter as is supposed; and although it is true, that milk however badly managed, will yield some cream, and that this will produce some butter, yet there is a very great difference both in the quality and qantity, which may be obtained from the same quantities of milk under different systems of management. There are various little details which are absolutely necessary to be attended to, in order to ensure the best results, which are but too often undervalued or neglected. To many, these are not known, and by some, if known, would not be regarded, but be thought merely the fanciful ideas of some theoretical writer. Nevertheless, they are essential and supported by all the weight which can be given by the results of various experiments.

There will always be many who, even if convinced of their propriety, yet would either from slothfulness or carelessness, pay no attention to them—but there are also others who wish to make only such butter as may be esteemed good, and who are willing to pay the necessary attention: to such, the rules laid down by our author will be found eminently serviceable. He has adopted the form of "Aphorism," as being more easily remembered, and these he has accompanied with observations, and statements of the experiments on which they are founded. We shall give them in their order.

"*First Aphorism.*—Of the milk drawn from any cow at one time, that part which comes off at the first is always thinner, and of a much worse quality for making butter, than that afterwards obtained: and this richness continues to increase progressively to the very last drop that can be drawn from the udder."

We extract the account of the experiments which were instituted, and on which this Aphorism is founded, these facts he states, "have been confirmed by numerous subsequent experiments and observations."

"Having taken several large tea-cups, exactly of the same size and shape, one of them was filled at the commencement of the milking of the cow, and the others at regular intervals till the last, which was filled with the dregs of the stroakings. A counter weight being put in for each cup, they were individually weighed, so as to ascertain with precision, that the same quantity of milk was contained in each cup. From a great number of experiments, frequently repeated with many different cows, the result was, in all cases, as follows:—

"The quantity of cream, obtained from the *first drawn* cup, was in *every case* much smaller than that from the milk last drawn: and the milk in the cups intermediately filled, afforded less or more cream, accordingly as they were nearer the beginning or the end of the milking. It is unnecessary here to enter into details of these intermediate proportions: but it is proper the reader should be informed, that the quantity of cream obtained from the last drawn cup, *from some cows*, exceeded that from the first in the proportion of *sixteen* to *one*. In other cows, however, and under particular circumstances, the disproportion was not equally great, but in no case did it fall short of the ratio of *eight* to *one*. Probably, on an average of a great number of cows, it might be found to run at the proportion *ten* or *twelve* to *one*.

"The circumstances which chiefly occasioned a variation in regard to these proportions, was, the nearness to, or the distance from, the time of calving: for, in all cases, the milk of the same cow was thinner after calving, than it was at a greater distance from it: and the disproportion between the first and the last drawn was also much greater, soon after calving than at a more distant period. As the flush of milk occasioned by that incident abated, it generally became thicker, and more uniform in quality; so that if, within a fortnight after calving, the proportion of cream from the first and the last drawn cups were as *sixteen* to *one*, it is probable that, at the end of six or nine months, the disproportion in that cow's milk would not be more than as *ten* or *twelve* to *one*.

"These variations, however, do not take place in the same proportion in every cow; on the contrary, the milk of some cows at all times varies more in this respect than that of others; so that in this case, as in most others, the nature of the breed, and the individual idiosyncracy, or peculiar constitution of the animal, must both be adverted to before any certain conclusions can be drawn,

"But, if the difference in the *quantity* of the cream obtained at the beginning and at the end of the milking be great, the variation in point of the *quality* of that cream is still greater. In the first drawn cup, especially when the difference in quantity was very great, the cream upon it was only a thin white tough film; in the last drawn cup, it was of a thick butyraceous consistence, and of a glowing richness of colour, which no other kind of cream is ever found to possess.

"The difference in the quality of the *milk*, which remained after the cream was separated, was perhaps still greater than what respects either the quantity or the quality of the cream. The milk drawn in the *first* cup was a thin blueish liquid, appearing as if a large proportion of water had been blended with ordinary milk; while that drawn in the last cup was of a thick

consistence, yellow colour, rich taste, more resembling cream than milk in all respects, only sweeter to the taste, and less oily upon the palate.

"From this experiment it appears, that the person, who by the bad milking of his cows loses a little milk, loses much more than is usually suspected; for if he leave behind only half a pint of milk that might have been obtained, he in fact loses as much cream, as would have been yielded by about *six* or *eight pints* at the beginning; and loses, besides, that portion of the cream which alone can give richness and high flavour to his butter. Many other useful corollaries might be deduced from the preceding experiment, which our limits do not allow us here to enumerate; but some of them will occur in the sequel."

The second, third and fourth Aphorisms, are not accompanied with any statement of facts. We give them entire, that our readers may have the full benefit of them, and their accompanying observations.

"*Second Aphorism.*—If the milk be put into a dish, and allowed to stand till it throws up cream, the portion of cream rising first to the surface is richer in quality, and greater in quantity, than that which rises in a second equal space of time: and the cream, which rises in the second interval of time, is greater in quantity, and richer in quality, than that which rises in a third equal space of time: that of the third is greater than that of the fourth, and so of the rest; the cream that rises continuing progressively to decrease in quantity, and to decline in quality, so long as any rises to the surface.

"The author's experiments in this case not having been conducted with so much accuracy as the former, he is not enabled to ascertain the difference in the proportion which takes place in equal periods of time: but they have been so often repeated as to leave no room to doubt the fact, which is confessedly of no small importance in the management of the dairy. It is not certain, however, but that a *greater quantity* of cream may, upon the whole, be obtained from the milk by taking it away at different times: but the process is so troublesome, as not to be counterbalanced by the increased quantity obtained, if, indeed, any additional quantity be thus obtained, which is not as yet fully ascertained. But where the quality of the butter is the principal object in view, it may be greatly improved by attending to this peculiarity.

"*Third Aphorism.*—Thick milk always throws up a much smaller proportion of the cream which it actually contains, than milk that is thinner; but that cream is of a richer quality: and if water be added to that thick milk, it will afford a considerably greater quantity of cream, and, consequently more butter than it would have done if allowed to remain pure; but its quality is, at the same time, greatly debased.

'This fact must have long since been remarked by every person attentive to a dairy; though no experiment appears to have been made, which could ascertain either the precise amount of the increased quantity of cream that might thus be obtained, or of the proportionate decrease in its quality. But the effect of mixing water with the milk, in a dairy, is thus ascertained; and the knowledge of this fact will enable attentive persons to follow that practice which they shall find best calculated to promote their interest.

"*Fourth Aphorism.*—Milk, which is put into a bucket or other proper vessel, and carried in it to a considerable distance, so as to be much agitated, and in part cooled before it be put into the milk-pans, to settle for cream, never throws up so much or so rich cream, as if the same milk had been put into the milk pans directly after it was milked.

"The loss of cream will, in this case, be nearly in proportion to the time that has elapsed, and the agitation which it has sustained, after it has been drawn from the cow; though we are not enabled to state, from experiment, *how much of that loss* is to be ascribed to the time and agitation, taken sepa-

rately. The fact, however, is established, and is of such importance that it cannot be made too extensively known."

"*To make butter of a very good quality*," the first drawn milk should be rejected, as well as that from the inferior cows. The milk thus rejected, may be advantageously employed in the rearing of calves, which may be expeditiously accomplished by separating the calves from their mothers, and when brought together, permitting them to suck a certain portion before any is drawn from the cow; this will leave only the richest part for the dairy. In the Highlands of Scotland, where very excellent butter is made, this plan is adopted—it is also in common practice, in this State. But to make butter of the *best* quality, not only the last drawn milk should be used, but also only the cream which rises first. This would require a very large dairy, and would be too expensive for common consumption. Our author thinks it might be carried into effect in a dairy where cheese is the principal object—this would certainly make the cheese less rich, and, consequently, render it inferior.

As soon as the milk has been brought into the dairy, (which should be as soon after it has been drawn from the cows as possible) it should be strained into dishes, (pans) for the purpose of throwing up its cream—however large these may be, the milk should never exceed three inches in depth, as experience proves that more is obtained with this than any other. We cannot judge of the proper period for separating the cream, by the length of time which has elapsed since it was *set*, as the rapidity of the changes which milk undergoes, depends on the temperature of the season. In summer this is likely to take place much too soon, and before all of the cream has risen to the surface. In winter, the process is very slow, and the cream rises proportionably slow. Artificial means should be resorted to in both seasons, either for reducing or increasing the temperature of the milk-room. The general rule is to remove the cream as soon as the milk becomes perceptibly acid. This will give the greatest quantity of cream, and the butter made from it, will be very good; but to make the *best*, the cream should be removed before this is even perceptible. To permit it to remain until it coagulates, as is common with us, is decidedly wrong; for although the spontaneous separation of the cream does not take place, according to our author, until acid be generated, yet, after the cream has risen, if it be permitted to remain, the acid will dissolve it, and, in the place of a thick, rich, butyraceous substance, will be found only a thin whey. We subjoin the observations of our author on the spontaneous separation of cream.

"It is not generally known, that the spontaneous separation of cream, and the production of butter, are never effected, but in consequence of the production of acid in the milk: and the formation of that acid is accelerated by the separation of carbonic acid gas (fixed air), from the milk, which

is accelerated or retarded by circumstances not usually adverted to. This important fact was discovered during the course of experiments on milk already alluded to, which were made many years since, and were occasioned by the following circumstances:—

"Having remarked, that of two tea-cups, which, from previous experiments, the author knew to contain milk of the same quality, one had the cream upon it at one time of a different consistence from the other; and, being at a loss how to account for this variation, he tasted the milk in each of the tea-cups, and found one of them sensibly more acid than the other. A piece of newly-slaked lime having been accidentally nearer to one of the cups than to the other, a suspicion arose, that it might be occasioned by this circumstance. With a view to ascertain this fact, two tea-cups were ordered to be immediately filled with equal quantities of the same milk, and one of them was immersed up to its brim in a quantity of quicklime, which had been so long slaked as to have acquired the same temperature with the air, but was not become altogeter effete; the other tea-cup was placed in the same apartment, at the distance of about a yard from the former. The result was, that in the course of twelve hours, the milk in the tea-cup placed among the lime, tasted most sensibly sourer than the other; the cream, also, was more perfectly separated from it than from the other.

"The converse of this experiment was not repeated, for want of the requisite conveniences at the time; but, there is no doubt, that, were milk placed in a vessel filled with mephitic gas, the acidification of the milk would be retarded, and the separation of the cream would consequently be postponed. However this may be, it is a certain fact, that neither cream nor butter can be octained from milk, until some portion of acid be produced in it: and hence it is, that, when fanciful people attempt to churn milk newly drawn from the cow, the operation must be continued till the acid be generated; and the churning must be protracted much longer than would have been necessary, under other circumstances, which invariably impairs the quality of the butter. Now, since nothing tends so much to deteriorate the quality of cheese, as acidity in the milk from which it is made, it must follow, that when cream is separated from it in the usual way, for making butter, the milk must have attained such a degree of acidity, as to prove highly detrimental. It must, therefore, be an injurious practice to make butter in a cheese dairy, after the usual manner; but not if it be made conformably to the practice above recommended.

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"But, for an ordinary market, experience has convinced the author, that, if in general, about half the milk be separated at each milking, and the remainder only be set up for producing cream; and if that milk be allowed to stand to throw up the whole of its cream, even till the milk tastes perceptibly sourish, and if that cream be afterwards carefully managed, the cream thus obtained will be of a quality greatly superior to that usually obtained at market; and its quantity will not be materially less than if the whole of the milk had been set apart for procuring cream. Such is the practice we would recommend, as most likely to suit the *frugal* farmer; for his butter, though of a superior quality, could be afforded at a price which would alway insure it a rapid sale."

The method of separating the cream from the milk usually recommended, is to raise it at one of the sides of the dish, and permit the milk to run off, leaving the cream at the bottom; this is not very easily done, and we have, in its stead, adopted the plan of removing it with a skimming dish made of tin, slightly concave, and thickly perforated with small holes. This passes easily under the cream, even when the milk has coagulated, and acting also like a strainer, permits the liquid milk or whey to escape,

whilst the cream, owing to its thicker consistency, is retained. When collected, it should be put into a vessel which has a stop-cock or spigot near the bottom: this will be found useful in drawing off the whey which settles there, and which, if permitted to remain, would would injure the quality of the cream. The time which should elapse before it is churned, must depend on the Superintendant, as no specific directions can be given. The process of churning must be performed with care, and the stroke given be regular, "as a few irregular strokes may render the whole of the butter of scarcely any value, which, but for this circumstance, would have been of the finest quality." The temperature of the cream, whilst the process of churning is going on, is of more importance than is usually supposed. It has been ascertained by some experiments, which are given in full in the "Transactions of the Highland Society of Scotland," that the proper degree of temperature at which to commence churning, is from 50 to 55°, and the cream never should be heated in the operation above 65° Whenever it varies much from this, both the quality and quantity of butter is materially affected.* The churn should, in summer, be plunged into cold, and in winter, into warm water, in order to preserve this temperature as near as possible.

The directions for separating the butter-milk from the butter, although not new, yet are, perhaps, not generally known, and we particularly call the attention of our readers to that part in which the washing of the butter is condemned, as the practice is very common among us.

"As soon as the butter is made, it must be separated from the milk, and be put into a clean dish; the inside of which, if of wood, should previously be well rubbed with common salt, to prevent the butter from adhering to it. The butter should then be pressed and worked with a flat wooden ladle or skimming dish, having a short handle, so as to press out all the milk that may be lodged in the cavities of the mass. A considerable degree of dexterity, as well as of strength, is requisite in this manipulation: for, if the milk be not entirely removed, the butter will infallibly spoil in a short time; and, if it be much worked, the butter will become tough and gluey, which greatly debases its quality. In some places, it is the practice to beat up the butter with two flat pieces of board, which may perhaps answer very well.

"In this operation, some persons pour cold water upon the butter, for the purpose of *washing* it: this practice, however, is not only useless, for the butter can be perfectly cleared of the milk without it; but it is also pernicious, and debases the quality of the butter in an astonishing degree. Nothing is so detrimental in a dairy, as water improperly used; which, if mixed in any way, either with milk or butter, tends greatly to debase the quality of the latter."

We will close this part of our subject, by extracting the directions for curing of butter, which appear well worthy of attention.

* In some future number, we will publish these experiments in full, as they contain much interesting matter.

"After the butter has been beaten up, and cleared from the milk, as before directed, it is ready for being salted. The vessel being previously rendered as clean and sweet as possible, every part of its inside must be rubbed with common salt; and a little melted butter should be poured into the cavity between the bottom and the sides: at their joining all round, so as to fill it, and make it every where flush with the bottom and sides. It is then fit to receive the butter. An excellent composition for preserving butter may be made, by reducing into a fine powder, and carefully mixing together, sugar and nitre, each of one part, and two parts of the best common salt. Of this composition, one *ounce* should be thoroughly mixed with *every sixteen ounces* of butter, as soon as the latter has been freed from the milk; and the butter must be immediately put into the firkin, being pressed so close, as to leave no air-holes, or any kind of cavities within it. The surface must be smoothed; and, if a day or two be expected to elapse before more can be added, the vessel must be closely covered up with a clean piece of linen, upon which should be laid a piece of wetted parchment, or (if this be not procurable) with a piece of fine linen dipped into melted butter, that is exactly fitted to the edges of the vessel, all round, so as to exclude the air, as much as possible. When more butter is to be added, these coverings are to be removed; and the butter is to be applied close upon the former layer, pressing it down, and smoothing it as before, till the vessel be full. The two covers are then to be spread over it with the greatest care; and a little melted butter is to be poured all round the edges, so as to fill up every part, and effectually to exclude the air. A little salt may then be strewed over the whole, and the cover be firmly fixed down.

Butter thus cured, does not taste well till it has stood at least a fortnight after it has been salted; but after that period, it acquires a rich marrowy taste, and will continue perfectly sweet in this climate for many years. As, however, its quality is liable to be impaired by being improperly treated while it is using, it will be necessary, when the firkin is opened, first to pare off a small portion of the whole surface, especially near the edges, in case the air should, by any accident, not have been entirely excluded. If it is to be quickly consumed, it may be taken up as it is wanted, without any other precaution than that of keeping it carefully covered up: but, on the contrary, if it is to be used very slowly, and if the person employed to take it up, be not very careful in closing it up each time with the covers, the part which is thus exposed to the air, will be liable to contract a small degree of rancidity. To prevent the occurrence of this inconvenience, when the vessel is opened, a strong brine of common salt (strong enough to float an egg) should be poured, when cold, upon the surface of the butter; and, although the quality of the latter will be slightly injured by the action of the water upon it, yet that is a much less evil, than the slightest rancidity would occasion.

"When butter is to be exposed to the heat of a warm climate, it should be purified by melting before it is salted and packed up. For this purpose, let it be put into a proper vessel, and this be immersed into another containing water. Let the water be heated till the butter be thoroughly melted: let it continue in this state for some time, when the impure parts will subside, leaving at the top a perfectly pure transparent oil. This, when it cools, will become opaque, and assume a colour nearly resembling that of the original butter, being only somewhat paler, and of a firmer consistence.

"When this refined butter is become a little stiff, but while it is still somewhat soft, the pure part must be separated from the dregs, and be salted and packed up in the same manner as other butter; it will continue sweet much longer in hot climates, as it retains the salt better than in its original state."

(To be continued.)

SELECTIONS.

Art. I.—*On the Natural History of the Honey Bee, and on the Importance of its Products.*

[FROM THE NORTH-AMERICAN REVIEW.]

The bee seems to be a native of every part of the globe, and the same characteristic traits distinguish the whole race; we allude simply to the honey bee, the *apis mellifica*. Even in New South Wales, we find that, excepting in some variation of size and colour, the honey bee is the same with that of Europe and America. The history of one bee, and of one community of bees, is, with the slight variation which is always produced by climate, the history of the whole race; nor should we venture to add our stock of observation to the great mass of what is already known upon the subject, and accessible to every class of persons, did we not wish to excite the attention more particularly of those who inhabit the mountainous districts of our country, to this practicable and profitable branch of horticulture.

From the commencement of history, to our own day, bees have been an object of attention, honey has been used, and wax has been an article of commerce. In fact, the amount of the former consumed for food, medicine, and a pleasant beverage, and of the latter for various purposes in the arts, would astonish those who have never turned their attention to the subject. In the savage and civilized state, wherever there has been sun enough to mature a flower, every individual of the community is as familiar with the luxury of honey, and the merits and uses of bees' wax, as with the daily food that is consumed.

Man has never been slow to appropriate to himself the physical powers of the inferior animals; but of all those which have been subdued to his use, the bee alone has preserved its independence. We ought not, in fact, to use the term *subdued*, as it does not apply to the situation or position which the bee holds among us in its domestic state. Neither its nature nor its habits are, in anywise, altered or modified. It preserves its singular economy unchanged, whether it inhabit a hollow tree in the midst of an unfrequented forest, or an hive in the centre of an apiary.

And here we would remark, that a hive ought not properly to be considered as the house or habitation of the bee; for even in the forests, where there may be supposed to be abundance of hollow trees suited to their purposes, bees have built their cells

on the under side of a stout branch; and they have neglected the convenient form of a well constructed hive, to attach themselves to the eaves of a house, or to the inner sides of a chimney. The nature of this part of their instinct goes no further than to secure a *firm roof* to which they can attach the cells, and a position that shall protect the cells from the sun and rain.

This faculty or instinct is sometimes at fault, for we often hear of their adopting the strangest and most unsuitable tenements for the construction of cells. A hussar's cap, so suspended from a moderate sized branch of a tree, as to be agitated with slight winds, was found filled with bees and comb. An old coat, that had been thrown over the decayed trunk of a tree and forgotten, was filled with comb and bees. Any thing, in short, either near the habitations of man, or in the forests, will serve the bees as a shelter for their combs.

If this instinct were as absolute as some persons would make us believe, the bees, when swarming, would undoubtedly choose a domicile as nearly similar to the one they had left as possible; but this is rarely the case. In their pursuit of food, with which the woods as frequently supply them as the gardens, their quick eye guides them to the places suitable for the establishment of a swarm. They do not, by a distinct succession of thoughts, arrive at the conclusion, that the hollow tree will suit them as a dwelling; but they find it unoccupied, they pass it daily, and when the whole swarm is collected on the branch of a tree, these foraging scouts that have espied the hollow tree, run over the mass of bees as they hang, give the signal of departure, lead the way to the woods, and the queen and the whole swarm follow to the selected tree.

But although the bees are rarely unprovided with a retreat for a new swarm, yet they readily accept of a more obvious one when offered. Aware of this willingness on the part of the bees, man takes the opportunity when they are collecting their numbers, of introducing them into a hive, and of bringing them under his own immediate *surveillance*, that he may more easily partake of the fruits of their labours. Yet, although colony after colony have dwelt in uninterrupted succession in a particular apiary, their instinct is not improved, nor their reflective powers enlarged. They are the same in all their instincts and formations, as they were when the first observations on their habits, with which we are acquainted, were made.

We have for seven years had a little colony under our immediate inspection, and we began our personal observation with the knowledge of all that ancient and modern theorists have advanced in relation to the habits, customs, and manners of this wonderful insect. We came to their superintendence with a mind tinctured with all that was marvellous and fanciful, and with an ardour that seven years have not subdued; although

theory after theory have now melted away, and most of the wonders and enigmas have been solved and reduced to the clearest and most simple particulars. Our wonder and admiration, however, although deprived of the charms of the fanciful legends, in which the history of the bee was embodied, are still undiminished, nay, increased, for an elevation of thought and feeling has been produced by the study.

Nothwithstanding the astonishing sagacity to be traced in the economy of bees, and the diversity of habits which might be expected, nature, in reality, is less variable in this instance than in most others; for although climate and a contracted habitation may reduce their size, and scantiness of food their numbers; yet, as long as there are flowers, the bee will abstract the honey, and as long as there are forests, the bee will construct a cell. With other insects and animals, and even with man himself, the case is different. Insects will imbibe nourishment from the exudations of both animal and vegetable substances. Man can accommodate himself to every variey of diet, and thrive on all. The bee alone never changes its food. The sweet sap that exudes from vegetable pores, and which is accumulated from the nectary of flowers, serves alike to sustain the bee, and to render the seeds of plants fit for germination. As no flower can arrive at maturity without the assistance of this fluid, it is ever present; and as the bee has a two-fold duty to perform, that of preserving its own being by such means as Nature has pointed out, and that of assisting the winds in carrying the pollen from flower to flower, Creative Wisdom has so arranged it, that the peculiar food of the bee is in abundunce. And as this nutritive fluid is to support inanimate life, which requires an unvaried and uniform food, the bee forever partakes of the same nourishment, and is enabled to preserve its peculiarities of form and instinct unaltered, from generation to generation.

For both the operations, therefore, of sustaining life, and of dispersing pollen, which require uniformity of instinct and organization, the bee is the same in all situations, and in all ages. The working bees have the instinctive faculties of building different shaped cells, of choosing and preparing food both for the larvæ and for themselves, of taking care of the young brood, of carrying off noxious and extraneous matters, of defending themselves from enemies of *their own species*, and of expelling the drones when they are no longer of use in the hive. They have the instinctive knowledge that they cannot, as other insects do, exist individually; the cells are constructed, therefore, in so admirable a manner, as to make every thing subservient to the safety and comfort of the mother of the brood. She is, in their estimation, as much a part of themselves as an eye or a limb. Their care of her is a kind of self-preservation, a law implanted in every living thing.

After rejecting all the fanciful and marvellous speculations of the theorists, there are still several material points unsettled, on which we propose to make a few remarks at the present time.

1st. The most modern and the most rational theorists differ in their opinion respecting the accuracy of the facts that are stated in relation to the queen bee leaving the hive at any other time, than when she goes forth with a new swarm.

2d. They dispute likewise on the possibility of the bees making a queen bee from a neuter, when circumstances require it.

3d. They are still ignorant whether the drones perform the office of nurse to the larvæ, when deposited in the different cells.

On the first point we venture to state unhesitatingly, that *the queen bee never leaves the hive but when she accompanies a swarm.* For ten weeks we fixed our attention on the entrance of two hives that stood close to each other on a bench. Our watch, either in person, or entrusted to another as interested and vigilant as ourselves, commenced at grey dawn, and continued until sunset; and never, within that period, did the queen bee of either hive leave them but at the time of swarming, which occurred once in each hive during our inspection. With an eye to this single circumstance, we have, for six successive years subsequent to the careful observation just stated, been in the constant habit of noticing every peculiar movement, at the entrance of the hives, but we never saw the queen. Independently of the reliance that can be placed on observations of this kind, we have confirmation derived from strong probabilities.

The average number of a hive or swarm is from fifteen to twenty thousand bees. Nineteen thousand, four hundred and ninety-nine are neuters, or working bees, five hundred are drones, and the remaining *one*, is the queen, or mother! Every living thing, from man down to an ephemeral insect, pursues the bee to its destruction, for the sake of the honey that is either deposited in its cell, or secreted in its honey bag. To obtain that which the bee is carrying to its hive, numerous birds and insects are on the watch, and an incredible number of bees fall victims in consequence to their enemies. Independently of this, there are the changes in the weather, such as high winds, sudden showers, hot sunshine; and then there is the liability to fall into rivers, besides a hundred other dangers to which bees are exposed.

Can any one, who considers all these casualties, suppose that the instinct in bees is so defective, as to allow so important a member of the community, and the only one of the kind too, to leave the hive, and run the immense risk that would attend an excursion in the air? It is a well established fact, that one queen lays all the eggs of the hive; that part of the daily duty of the working bees is to nourish the young brood, which if there was no queen they could not do, as there would be no eggs. If the

bees are disturbed in their regular routine of business, they become uneasy and incapable of proceeding. When they return from the nectary of flowers with the usual quantity of sweet fluid, they hasten to bestow the first or uppermost part of the honey on the larvæ and yonng bees; and when this simple, undigested liquid is disposed of, they deposit that which has gone through a certain chemical process in the cells.

If, therefore, on entering a hive they find no queen, they run about anxious and distressed, drop the little pellets of pollen that are attached to their legs, strike their antennæ against one another, and are in great agitation during the day. Sometimes two days are passed in this restless state, before they make an effort to repair their loss.

If the queen bee were to leave the hive, as Huber and others fancy, she would run great risk in never being able to return to it. Even around the apiary, before she had made the usual evolutions in the air, common to all bees on leaving the hive, she might become the prey of one of the many birds that are hovering over head, or on the watch; these swallow bees by dozens while on the wing; and the queen bee would have less chance of escape, as she is larger, and therefore more conspicuous; and is besides very slow and heavy in her motions, her wings being smaller, in proportion to her body, than those of the working bee and the drone.

From our own observations, therefore, as well as from the above inferences, we must believe that the queen bee *never* leaves the hive, but for the establishment of a new colony.

The next material point of dispute is, whether it be in the power of the working bees to convert the larva of a working bee into that of a queen, when by accident the hive is deprived of one. According to the most accurate naturalists, the organization of the queen, or mother bee, is different from that of either the drone or the neuters. It appears to us quite as rational and philosophical to suppose that a queen bee could be converted into a neuter, and, therefore, that all bees at first were of the shape and organic structure of the queen, as to suppose that a neuter or working bee could have new organs added, new curves given to its limbs, and new instincts to its nature.

If we could see the interior of a hive whenever it suited our convenience, we should not be so lost in conjecture; but the irritability of these little insects prevents a constant and minute internal inspection. It is a part of their instinct to know that *light*, *heat*, *cold* and *moisture*, in an undue and unaccustomed degree, are prejudicial to the formation of wax, to the consistence of honey, and to the health of the brood. They, therefore, use all the little arts and advantages they possess, to prevent any one from exposing them to the injurious influence of these active powers.

When a queen bee ceases to animate the hive, the bees are conscious of their loss; after searching through the hive, for a day or more, they examine the royal cells, which are of a peculiar construction, and reversed in position, hanging vertically, with the mouth underneath. If no eggs or larvæ are to be found in these cells, they then *enlarge* several of those cells which are appropriated to the eggs of neuters, and in which *queen eggs have been deposited.* They soon attach a royal cell to the enlarged surface, and the queen bee, enabled now to grow, protrudes itself by degrees into the royal cell, and comes out perfectly formed, to the great pleasure of the bees.

Now this in itself is curious and wonderful. There is no need of adding superhuman powers to an insect, when the simple facts show such singular sagacity. The truth is, that the queen, or mother bee, lays the neuter eggs in certain cells of a particular construction; in fact, the eggs are laid, or at least many of them, as soon as the foundations are begun, before the cells are built. The bees know, from the peculiar shape of the egg, that it is to have a cell of certain dimensions. When the neuter and drone eggs are deposited, the royal cells are then filled; for abundant observations prove that the queen eggs are laid last. If the royal cells are not sufficient to hold all the queen eggs, they are laid in the *common cells;* and, in the course of the regular business of the hive, these cells are attended to with the rest. When the larva is of a size to fill the cell, a covering of wax is put on, and here ends the life, or rather the embryo of the queen; for no longer having room to expand, it perishes, and is dragged out in the nymph form, as soon as the bees discover that animation is extinct. If, during the progress of the egg from the larva to the nymph state, the mother queen dies, and there are no eggs in the royal cells, then the bees have recourse to the queen eggs that are laid in the common cells. By enlarging the entrance, and attaching to it a cell, which hangs *vertically*, they continue the life of the larva, and a queen bee is formed.

Here is no work of transformation. The insect is already formed, and nothing remains to be done, but the mere mechanical operation of building a habitation, which shall be adequate to its wants. The peculiar organic construction of the queen bee perhaps, requires a difference of food, as we perceive it does of dwelling. No doubt it is necessary to supply it more abundantly, and with greater care.

The very position it is compelled to take shows that it requires a different kind of nurture from either the common bee or the drone. It is wonderful that instinct is so competent to direct those changes; but it would be more than wonderful, if, in addition to this instinct, the bee had the power *to construct new organs*, as it does different cells, and thus to endow the insect with a different nature.

The third point unsettled, and which is likely to remain forever a secret, is, whether the eggs of the queen are hatched after the manner of fishes; whether they simply are animated by incubation, or by the care and nourishment bestowed upon them.

On this point experiment has proved nothing. The greatest diversity of opinion exists. There are upwards of a thousand writers on the history and policy of the bee, and yet no two have either observed or reasoned alike. Even the two distinguished naturalists, who have passed the best portion of their lives in studying bees, with equal zeal, and with equal opportunity, have come to very different conclusions. Huber is by far the most circumstantial experimentalist who has turned his attention to this subject. But his truly philosophical mind has been rendered comparatively useless, nay worse than useless, by the ignorance or wilful misrepresentations of his assistant, Francis Burnens. Huber could not but philosophize on facts as they daily were represented to him. His solutions of things *unreal*, and having *no truth in nature*, are most ingenious and rational. Had his physical sight been as perfect as his mental vision, his work would, doubtless, have been all that could be effected by the industry and talent of man.

The naturalists of Europe, misled by his extraordinary talent, adopted Huber's notion with respect to bees, and his opinions were considered as conclusive. The public opinion became imbued with the spirit of his doctrines; and we find the greatest and acutest reasoners discussing, in perfect security, the nature of an insect, that could at one moment organize animal life, and impart to it new instincts; and in the next, construct bulwarks and other modes of defence, to protect itself from an enemy, that until the last century never molested it.

The real fondness that was inspired for the study of the bee, by the interesting work of Huber, engaged many in the pursuit; and the very mistakes that he has made, have led to something nearer the truth. Owing to the general improvement in education, the taste for the marvellous is fast disappearing; and there are many who sit themselves down to the study with their reason unbiassed, and their judgment free to decide according to the evidence of facts.

Huish, amongst the late writers, has most successfully combatted the principal errors in Huber's theory; but although he has fixed a base on which a rational theory may be built, his object seems less to elicit truth, than to expose the errors of Huber. This he has endeavoured to do in the most unamiable and bitter spirit, which destroys the gratification with which his book would be read by the candid inquirer. In addition to this, he has laid himself open to plagiarism. He must have studied the subject sufficiently to acquire a knowledge of the different forms of hives that have been in use from the earliest antiquity to his own time;

and the peculiar shape of the Greek hive could not have escaped his vigilance, for drawings and descriptions of it are within the reach of every student; yet he boldly states, that a flower-pot first gave him the idea of the plan which he adopted for his own hive.

(To be continued.)

Art. II.—*Culture of Silk.—The Mulberry.*

[FROM THE BALTIMORE GAZETTE.]

The first object of attention to a person contemplating the culture of silk, is to secure an abundant and convenient supply of mulberry leaves, without which he, of course, can do nothing. The supply must be abundant, that he may not from any cause be obliged to stint the worms, at a moment when his whole crop depends upon a full and free supply of food, which is during the last ten days of their feeding; and it must be convenient, that the expense of attendants for gathering leaves may be as small as possible. There are many accidents that may cause the loss of leaves; during a spell of wet weather it is necessary to gather a supply for a day or two a-head, that they may be dried before feeding them to the worms; these may become spoiled, and thus lost. Therefore, if we intend to keep worms enough to consume the leaves of one hundred trees, we should always have 150 to 200 trees, and this will be no loss to the proprietor, as ultimately, he will find his account in not robbing the trees of their foliage too much, and he will thus be able to favour them in this respect, should he meet with no loss of leaves. It will also be advisable, always to have a nursery of young trees for transplanting, to fill vacancies occasioned either by decay or accident in his orchard. In general it may be calculated that a full grown tree will furnish leaves for 5000 worms; therefore, a pretty close estimate may be formed of the number wanted. They will require about one-third more room than apple trees.

There are several modes of propagating mulberry trees, viz: by *seed*, *cuttings*, *shoots* and *grafts*. The two first I consider the most eligible for this country, though the third is by no means to be rejected where available; for shoots will make tolerable trees. I consider the value of the several modes to be very different, and have set them down in the order in which I estimate them. The seed plant is undoubtedly best, both for food, for worms and duration; it is also most convenient, for seed enough can be sent by mail to any part of the union to produce an orchard sufficient to feed several millions of worms. Cuttings, in one respect are

preferable to seed. They generally save one year in maturing the orchard, but in all other respects they are inferior to seed. It is agreed among horticulturists, that trees propagated by cuttings or shoots, are not as long lived as those from seed. Cuttings and shoots are difficult of transportation, compared with seed. This is the greatest objection. It is unnecessary to dwell on this part of the subject, however, as *convenience* is more worthy of consideration than any thing else; and, therefore, the mode most convenient will of course be adopted.

The kind of mulberry most suitable for silk worms, bas been a subject of much dispute in this country, *but in no other*. Many persons have tried the native red mulberry, and concluded that it was equal if not superior to the foreign white. But having tried both several times, I am obliged to adopt a different conclusion. The silk produced from them was sufficiently strong, but it did not possess that fineness of fibre and richness of gloss that the product of the white mulberry did. As it requires the same labour and expense to propagate the one as the other, therefore, I think the white should aways be preferred. There are numerous varieties of white mulberry, any of which are better than the native, and some of which are better than others. The white mulberry is a tree, *not* "known by its fruit." Some varieties bear *black*, some *red*, some *white*, and others *purple* fruit. There is a tree in the garrison at Annapolis, which bears black fruit, the foliage of which is decidedly preferable to that of any other I have seen, for silk worms. There is also a tree about five miles from Annapolis, that bears both *white and black* fruit promiscuously; a black berry and a white one occupy the same fruit stem. The general distinctive feature of the varieties of mulberry trees is the leaf. I need not describe the *native*, for it is sufficiently known. The white has a leaf resembling in some respects that of the poplar—glossy on its upper surface, free from down on its lower, firm texture, and serrated edge. In shoots and young trees the leaf is often beautifully lobed.

To propagate the white mulberry, one ounce of good seed may be obtained. If all these seed vegetate, they will produce about eight thousand trees. As, however, there is much more *bad seed* for sale than good, care must be taken in selecting it. Nine tenths of the seed sold in the United States, is either old, or worthless from some other cause, the most common of which is its being gathered before perfectly ripe. The test of good seed in Europe is by no means infallible. They put it into cold water, condemning that which floats, and approving that which sinks. In the case of immature seed, this test fails, for if tried while fresh, it is just as heavy as mature seed; and if the seed be old, it fails also, for the specific gravity of old dry seed is less than that of water, and consequently it will float; when at the same

time a great part of it will vegetate. If, however, the seed be soaked in *hot water* a few hours, what is really good will sink, and the worthless will continue to float; and it may thus be tested, for the good seed alone will swell and sink to the bottom—whether the bad seed be so from age, premature gathering, or any other cause.

The seed should be planted in a bed, prepared as for lettuce or any other small seed, in a rich, warm soil, where in dry times it will not suffer from drought. It may be sown in drills like lettuce or radishes, and covered a $\frac{1}{4}$ or a $\frac{1}{2}$ inch deep with fine mould, as early in the spring as the ground and weather will permit; it will come up in 10 or 15 days. The weeds must be carefully destroyed, and in dry times frequent watering will be highly beneficial. Previous to planting, the seed should be soaked in hot water (not boiling) three or four hours, and then rolled in fine brick-dust, or plaister of paris. The trees will be fit for transplanting into nurseries in the fall, in the middle and and southern states, and early the next spring in the north. I have some trees, grown from seed planted last spring, (1829) that are now five feet high, and three quarters of an inch diameter at the but-end. Some recommend the summer, when the fruit is ripe, for planting the seed; but I think the spring the best time. After standing in the nursery two years, they may be transplanted into orchards, as other trees are planted, where they are to remain, and leaves may be taken from them after being there one year. I prefer transplanting in the fall, as the small fibrous roots which convey nourishment to the tree, have time to prepare for their functions by the vegetating season next spring. In all cases of transplanting trees, great care should be taken to preserve these very fine roots. The young trees should be pruned as other trees are, when intended for the orchard. If hedges for fences be wanted, the young trees may be taken immediately from the seed bed to the hedge row. The white mulberry forms an excellent live fence, and when once established is, probably, the most permanent of any other. The more it is broken and lacerated by cattle, the more impenetrable it will become; for every branch broken, a half a dozen shoots will immediately start out, till the bush forms a perfect bramble.* This mode is, therefore, recommended as accomplishing three important objects—supplying food for silk worms, keeping the trees low that the leaves may be gathered from the ground, and furnishing a good and almost never-ending fence. In transplanting young trees, for hedges, they should not be pruned; but the second year, or at least the third, the tops should be cut off, and the side branches trained laterally with the hedge, by interweaving them.

* It is not meant that cattle may be allowed free access to the hedge *while young*, as they would destroy it altogether; but that after it has become a good fence, they may be allowed to approach it with advantage.

Cuttings may be taken at any time after the fall of the leaf, and before the swelling of the buds in spring. They should be those shoots on the limbs of the tree of the last summer's growth, that grow perpendicularly, taken carefully off with a saw, including as much of the protuberance of old wood at their base as possible. They may be put in the ground immediately, or kept in dry sand in a dark cellar till the opening of the spring. They will generally be from two to four feet in length, and should be set in an inclined position, about one foot in the ground. In the fall or next spring, they may be transplanted into nurseries, and thence treated as seedlings. Suckers may be treated like young trees, as they generally have root enough to sustain them.

Grafting will never be followed in this country, as it is unnecessary for the silk culture, although it is generally practised in Italy; while at the same time Dandolo confesses that the leaves are not so suitable for silk worms as those from seedling trees.

The situation and soil for a mulberry orchard require no other attention than the choice of high ground—that is, a site neither marshy nor bottom land. Although the mulberry requires a warm, rich soil for the first year, it is perfectly indifferent as to soil forever afterwards. I have seen the tree in every variety of soil, from the poorest to the richest, and have been able to observe no other difference in its foliage than a more firm texture in that on poor land than in that on rich; and this makes a dry stony or even sandy soil preferable to a rich one.

As mulberry seed is getting to be an important article, it is deemed appropriate to give directions here for saving it; and particularly so, as there are hundreds of pounds of it lost every year, in Maryland and Virginia, that might easily be made to supply the place of imported seed. In the neighbourhood of Annapolis, a large quantity might be saved annually. When the fruit begins to ripen, every morning the tree should be shaken, and the fruit that falls, gathered with that which had fallen before. If enough is not gathered in one morning, several successive gatherings may be collected; but the fruit should not be kept over three or four days, before the seed is extracted; which may be done in the following manner:—Put the fruit into a tub and press and mash it till the berries are completely worked into a common mass. Then pour water into it and stir it briskly, that the pulp may be separated from the seed. Then pour off the water, with all the seed that floats, (as it is worthless) and renew the washing till the seed is clean, when it should be drained, spread out on cloths, and dried in the shade. When perfectly dry, it should be put into a tight keg, or other vessel, and kept in a dry place. It should never be exposed to the *light*, *air* or *dampness*, more than is absolutely necessary. The mulberry seed that is *really good*, *is worth its weight in silver*, as Messrs. Landreth of Philadelphia, sell it by retail, at *a dollar an ounce*,

and I take pleasure in recommending their seed as worthy of more confidence than any I have tried. Others, indeed, sell it much lower, some at four dollars a pound, but after *throwing away the cost of four pounds of it*, I am disposed to believe, that *one ounce* of Landreth's seed is worth more than a pound of the other, at least such as I have tried. White mulberry seed are of an obtuse, triangular shape, dull, dark yellow colour, and very full of oil.

Of the mulberry tree it may be remarked, that there is scarcely any other so tenacious of life. The coldest weather seems not to affect it, while all attempts to destroy it, when once fairly taken root, by grubbing it up, prove unavailing. Old trees have been cut down twenty or thirty years ago, and yet the old roots continue to throw up numerous shoots every spring, to the great annoyance of the tidy farmer. The young seedling of six months, has a root almost equal to the top, and therefore possesses a great advantage over other trees, for it can be set so firmly in the ground as to be secure from injury by the wind, and obviates the necessity of close pruning. When four years old, it is safe to gather the leaves, which should be done sparingly at first, taking a few from each branch, till the tree has nearly attained its full size, it may then be stripped of two-thirds of its foliage without injury. Indeed, I have stripped the tree entirely, and the next year it seemed to have a double quantity of foliage, in consequence of the numerous shoots produced by the excessive robbery. The white mulberry always puts out a second crop of foliage after being thus stripped, so that in the fall it exhibits little indication of the robbery in the summer. It is, however, better to economise in gathering the foliage, for the vigour of the tree will, undoubtedly, ultimately yield to continued excessive deprivation of leaves. Care should always be taken to destroy caterpillars at their first appearance in the spring, otherwise great loss of foliage will be sustained. They are easily destroyed when they first appear; but no efforts are sufficient after a few weeks quiet possession. When first discovered, the small branch containing the nest should be taken off and burnt; and the work is done.

GIDEON B. SMITH.

PART III.

MISCELLANEOUS INTELLIGENCE.

Ramon.—We find the following account of this useful tree in an extract of a letter from Henry Perrine, Esq. Consul of the United States at Campeche, to the Secretary of the Treasury, and published in the American Farmer.

"The '*Ramon*' is a flourishing tree in the driest seasons, whose leaves and branches are here the universal substitute for grass and cane as food for domestic animals—the greater number of which have no other means of subsistence. It is conceived to be, at the least, as worthy as the logwood of the experiment of transplanting to our coasts on the gulf of Mexico. Being most useful and ornamental, it abounds in the gardens and lots of every town and village. The produce of three acres may maintain a small family A newspaper paragraph, relating to the scarcity of food for animals at Mobile and Pensacola during the last season, has prompted this brief notice of the '*Ramon.*'"

Steam Plough.—A premium of one hundred guineas has been offered by Henry Hardly, Esq. of England, for the invention of a Steam Plough.

Sovereign Remedy against Mildew of Grapes.—The following is a letter from William Prince, of the Linnæn Botannic Garden, to the Editor of the American Farmer, dated July 6th, 1829.

"*Sir*,—I now transmit you the remedy against mildew, the effects of which I have witnessed so as fully to convince me of its adequacy. Mr. Samuel R. Johnson, of Massachusetts, is the gentleman who first communicated to me the information.

"Take a pint and a half of sulphur and a lump of the best unslacked lime of the size of the first, put these in a vessel of about seven gallons measurement, let the sulphur be thrown in first, and the lime over it, then pour in a pail of boiling water, stir it well, and let it stand half an hour, then fill the vessel with cold water, and after stirring well again, allow the whole to settle—after it has become settled, dip out the clear liquid into a barrel and fill the barrel with cold water, and it is then fit for use. You next proceed with a syringe holding about a pint and a half, and throw the liquid with it on the vines in every direction, so as to completely cover foilage, fruit and wood—this should be particularly done when the fruit is just forming and about one-third the size of a pea, and may be continued twice or thrice a week for two or three weeks—the whole process for one or two hundred grape vines need not exceed half an hour.

"In order to fully test the above, the process has been pursued in some cases with only half of a vine, and omitted towards the other half; the result was, perfect fruit on one where absolute failure attended the other.—Some persons use sulphur in a dry state, which is thrown on with a bellows suitable for the purpose, but the liquid preparation is far superior, and I think will prove that we are at last complete masters of the mildew.

"Yours, very respectfully, WILLIAM PRINCE."

Grafting the Vine.—We extract the following from the New-England Farmer:—"Early last spring I took two wild vines from the trees, where they grew naturally, which I suppose were an hundred years old. I dug a trench about six inches deep, from the roots to a convenient place, where I had trained the vine to graft. In this trench I buried the vine in suitable branches for grafting, and there inserted the grafts, which were also covered, leaving only one eye above ground. At the usual time for such buds to break, mine burst forth, with a degree of exuberance, which I had never before witnessed, insomuch that I had to prune them every ten days throughout the season, to keep them in tolerable order. Some of these grafts grew nearly twenty feet long, producing fine bearing wood for the next season. I think, on a moderate calculation, I shall have the ensuing season, several bushels of grapes from my two vines.

"CALVIN MORRELL.

"*Hamilton County, (Ohio) March* 25, 1829."

Ruta Baga, raised on new land for feeding Cattle.—At Dead River, Somerset county, Maine, where there are this winter from 3 to 600 yoke of oxen getting logs, the farmers raise Ruta Baga at the rate of more than 500 bushels to the acre, for feeding stock, by cutting, burning and clearing the new land, after which the seed is sown broadcast, and harrowed in. No more trouble is taken until harvesting. The whole expense of growing and harvesting a crop does not exceed ten dollars. A Mr. Folsom, who grows 100 tons of hay annually, and from 1500 to 3000 bushels Ruta Baga, informed the writer of this, that he could raise the roots cheaper to feed his stock, in part, than hay, although mowing lands in a state of nature can be obtained for a mere trifle.—*New-England Farmer.*

Everlasting Potato.—This root is ever ready to afford a supply of early potatoes from one end of the year to the other: they are left undisturbed, except when a dish is wanted; they are not deeply embedded, but soon discovered on stirring the surface mould. The flower seems somewhat different from that of the common potato. They should be planted about the latter end of May; if planted sooner, they come too early. Before frost sets in, the bed is covered with litter as a protection from its influence. They are taken up at Christmas, as fine new potatoes, and are either suffered to remain undisturbed. or, perhaps, what is still better, the potatoes are completely forked up as they are wanted, and the smallest being separated, are set apart for seed under a heap or hillock, to be replanted towards the close of the succeeding May. The smallest sprigs of this potato will grow.—*Gardener's Magazine.*

A tree of life.—The Algarrova tree, the growth of the Pampas and other provinces in South America, seems to have been expressly provided by Providence, for the sustenance of the rude inhabitants of these districts, and if it were by an accident to be exterminated, it is scarcely too much to say that the population would follow it! It is the universal sustenance of the poor, the idle, and the destitute; there is a drink made from its bean-like pod, which is really excellent; its seeds are ground into palatable and nutritious flour; its leaves are used as the general food for cattle; and its branches, which are studded with sharp pointed thorns, are stuck into the earth and wattled together into a sort of palisade, which even a starving bull will not attempt to break through, though he see the tempting pasture on the other side. The wood too, is not only excellent for all agricultural and architectural purposes, but is, from its hard and solid texture, almost as durable as coals for fuel, Finally, even dogs are fond of the pod, and pigs fatten on it better than any other food. The former will often leave their homes, and live in the algarrova woods as long as the pod is in season, and the poor inhabitants will none of them work—nor need they—while that portion of the algarrova tree lasts.—*New-England Farmer.*

Bees.—It is said that in Germany the bee-masters remove their hives from the apiary to the neighbourhood of fields, where buckwheat is sown, while that plant is in flower, in order that the bees may collect the honey which the flowers yield so plentifully. That bees are particularly fond of this honey, is well known to every cultivator, but it is attended with one bad consequence, viz. the honey is inferior. No fine-coloured virgin honey (the produce of a first swarm, or a cast) can be had from a neighbourhood where buckwheat has flowered. The colour is dark, and the honey is said to partake of the high spirituous quality of the seeds so much, that bad effects have followed, especially when given to children.—*Brit. Farmer's Mag.*

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Soap-suds for destroying Insects.—The Rev. Mr. Falconer, one of the correspondents of the Bath Agricultural Society, strongly recommends Soap Suds both as a manure and an antidote against insects. He observes, "this mixture of an oil and an alkali, has been more generally known than adopted as a remedy against the insects which infest wall fruit-trees. It will dislodge and destroy the insects which have already formed their nests, and bred among the leaves. When used in the early part of the year, it seems to prevent the insects from settling upon them." He prefers soap-suds to lime water, because lime soon "loses its causticity, and, with that its efficacy by exposure to air, and must, consequently, be frequently applied; and to the dredging of the leaves with the fine dust of wood-ashes and lime, because the same effect is produced by the mixture without the same labour, and is obtained without any expense." He directs to make use of a common garden-pump for sprinkling trees with soap-suds, and says if the water of a washing cannot be had, a quantity of potash, dissolved in water, may be substituted, and that the washing of the trees with soap-suds twice a week, for three or four weeks in the spring, will be sufficient to secure them from aphides, &c.

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Chloride of Lime.—This has been found by Mr. Alcock to be an excellent disinfectant. Of the chloride of soda he thus speaks:—

"The chloruret of oxide of sodium, in common with that of lime, has been shown to possess the valuable property of destroying the most putrid effluvia arising from animal substances, even when these effluvia are diffused to a considerable extent in the surrounding atmosphere: it has also the property, when applied to the substances giving off these effluvia, of arresting or destroying the progress of putrefaction. Not only does it possess this power with regard to dead and detached animal substances, but in those distressing forms of disease in which a part or parts of the living human body become dead and putrid, whilst yet attached to the contiguous tissues which preserve their vitality, it has the inestimable power of speedily ameliorating this most loathsome condition, by destroying the putrid odour emanating from the dead portions; and it moreover generally arrests the further progress of decomposition, and promotes the more speedy separation of the dead parts from the living, than can be obtained by ordinary means. It very often is capable of changing the nature of malignant, corroding and destructive sores, into the condition of simple ulcers: in many ulcers, not malignant, it is capable of greatly hastening the cure. In short, though not an infallible remedy, it is capable, under the guidance of medical and surgical skill, sound judgment and experience, of alleviating, and often of totally removing some of the most distressing and loathsome diseases to which animals are liable; diseases which, too often uncontrolled by remedies previously in use, have hurried numerous victims to untimely graves."

If the chloride of soda be thus useful in human surgery, it will not, probably, be quite inert in the quadruped. We have used it with manifest advantage in a case of fistulous withers, the putrid stage of distemper in dogs, and ulcerations of their lips and gums.

A French veterinary surgeon, M. Lard, in the spring of 1805, cured a glandered horse with it. And another military veterinary surgeon, M. Eti-

enne, was most succesful in arresting the progress of several diseases among the troop horses at the barracks of Moulins. The bad forage and situation of this place subjected the horses to attacks of glanders and farcy. Every attempt to arrest these maladies proved abortive, until M. Etienne used the chloride of soda. He diluted the solution of the chloride with twenty-four times its weight of water, and bathed the ulcers with it, and injected into the nostrils. The defluxion rapidly decreased, and in thirty-five days the animals returned to their work. The usual means of treating these diseases were continued at the same time, but these were perfectly ineffectual before the chloride was used.—*Veterinarian.*

On the Electro-attractive powers of the Spines and Leaves of Vegetables.—M. Aister thinks, that these organs not only fulfil the function of maintaining constantly in the plant the quantity of electric fluid necessary to its existence, but that they have the power of warding of lightening, and establishing the equilibrium between the earth and the clouds; in a word they are true thunder rods, *(paratonneres)*, and excellent preventatives of hail, *(paragrèles)*. He found, that when insulated spines were exposed to the atmosphere, when the electrical equilibrium was disturbed, they affected the electrometer.—*Bull. des Sc. Agric.* Feb. 1828.

On Manures, and the Nutrition of Plants.—The opinion of M. Astier is, that vegetables, like certain species of animals, are nourished by one substance only, which is exclusively necessary for them, and which their roots have the power of distinguishing and of choosing in the bowels of the earth; so that when they have exhausted the soil of all they find there, crops of the same kind, when sown, finding no longer their proper nourishment, suffer and die. M. Fourai de Salembeni, in a memoir on the particular nature of manures, has replied to this question, and undertaken to refute it. In his opinion, plants, instead of choosing their food, take up indiscriminately all the matters fit for vegetable nuitrition; and if a soil contain them, it is fit for the vegetation of all the plants of that climate. He disputes, also, that a soil, by means of a varied culture, can carry crops every year. He concludes, that the suppression of fallows, by the substitution of green crops, is impossible; that manures and frequent labour are the chief agents of improvement, and that they ought to be adapted to the nature of the soil, because a soil thus improved is disposed for every kind of vegetation; that the most powerful manures are those which contain the greatest quantity of organic matter in the least volume. Dr. Carry, in his *Reflections on the Memoirs of MM. Astier and Solembeni*, has exaggerated the consequences of this observation, that nature has placed each germ in the centre of a certain quantity of organic matter, destined to serve for its nourishment during germination, by saying that the matter of which the seed is composed, is the natural nourishment of the plant to which it gives birth; and that, consequently, the remains of the different parts of a plant are the best manure that one can choose. He objects to the opinion of M. de Salembeni, that all the plants of a climate can be equally well nourished on all kinds of soils in that climate, because each species of plant has an organization which can only accommodate itself to certain soils and exposures. M. Carry concludes, that vegetables are nourished by several alimentary principles, and have the power of choosing those which agree with their organization; that every field, if it contain matter fit for vegetation, is capable annually of ministering to the nutrition of the plants that agree with its climate and the qualities of its soil. He collects proofs in favour of the alternate culture in opposition to the ancient mode, and leads us to the true principles of Agriculture, in establishing, that we ought to apply ourselves, above all things, to the amassing of plenty of manure, composed of mixtures of all kinds of animal and vegetable substances, and for this end we ought to grow the greatest possible quantity of green crops for the support of the greatest possible number of live stock.—*Idem.*